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How to Make the Periodic Health Examination

A MANUAL OF PROCEDURE

BY

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AND

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FOREWORD BY

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1927

To

HORACE DOBELL, M. D.
(1828–1917)

In Whose Writings Sixty-five Years Ago Appeared the
First Reference in Medical Literature to the
Periodic Health Examination

66338

Dr. Dobell in 1861 Urged Periodic Health Examinations

(Extract from "Lectures on the Germs and Vestiges of Disease and on the Prevention of the Invasion and Fatality of Disease by Periodical Examinations,"* by Horace Dobell, M.D., published in London in 1861.)

"I am perfectly convinced, from my own observation and experience in practice, that patients never think of consulting their doctors till these conditions of impaired general health have advanced far enough to have been developed into some form of disease; that thousands and thousands of people, believing themselves to be in health, are nevertheless undergoing these early, occult, and evasive stages of defect in the physiological state; and that such persons may be considered to be in health, not only by themselves, but by any one accustomed to associate with them, even though it be a physician, and that even if they submit to a medical examination, as ordinarily conducted, they may be declared to be in health.

"I wish, then, to propose as the only means by which to reach the evil and to obtain the good, *that there should be instituted, as a custom, a system of periodical examination, to which all persons should submit themselves, and to which they should submit their children.*

"Such an examination must include an inquiry into the family history, to learn the hereditary constitution; into the personal history, to learn all the previous diseases that have been passed through, and the habits and vicissitudes of life; into all the conditions of life surrounding the individual; into the condition of the organs and functions of the body; into the state of the secretions and fluids of the body by analyses and microscopical examinations, and so forth.

"The examination should be reported in writing; and, after due consideration, such advice must be given as a careful judgment may dictate, for the future conduct, pursuits, and habits of the patient, with a view to correcting any defects or tendency to defects in the organism. Advice must also be given as to the means of removing any vestiges of disease that have been detected, or if they are not removable, advice as to the best way of overcoming their influence or of averting their increase. To this must be added precautions to be adopted in certain contingencies which, according to the judgment of the case, appear probable.

"If such a plan as I have here proposed were to be faithfully and conscientiously carried out by the present and rising generation of well-educated studious medical men, I think no one can doubt, after a careful consideration of the subject, that immense benefit would be conferred upon the public."

* This book was first brought to the attention of Dr. Fisk several months ago. In 1909, however, Dr. Dobell wrote Dr. Fisk commenting on the announcement of the Journal of the American Medical Association regarding the initiation of periodic health examinations in the life insurance field, and stated that he had recommended such a measure to British life insurance companies forty years previously, but that he could get no action.

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FOREWORD

PERIODIC physical examinations are of exceedingly great importance in the maintenance of health. The physical examination of an apparently healthy person must be systematically and thoroughly performed in order that injurious habits of living and slight or beginning functional or structural abnormalities may be revealed. The early detection of these conditions permits the application of corrective measures at a time when they will be most effective in preventing serious health impairment. This book provides a method of conducting a systematic examination which will obviate errors and assure the detection of obscure but vital defects.

MERRITTE W. IRELAND,
Major-General.

Surgeon-General, United States Army.

PREFACE

THIS Manual is the outgrowth of a smaller one (copyrighted in February, 1925) prepared with the assistance of a special committee of the medical staff of the Life Extension Institute. Previous to that time, so far as we know, there was no definite standardized outline of procedure available to physicians conducting periodic health examinations covering in an intensive way each region of the body. For more than two years the original manual has been used by physicians at the head and branch offices of the Institute (where no medical treatment is given) and it has been of material assistance in furnishing the groundwork for this more comprehensive volume.

There is wide-spread and increasing interest in the periodic health examination movement. It is receiving attention not only from voluntary health organizations, industrial concerns, and insurance companies, but from hospitals, clinics, individual physicians, and the public generally. The National Health Council, which includes in its membership such important organizations as the American Public Health Association, the National Tuberculosis Association, and the United States Public Health Service, some time ago sent out a nation-wide appeal for a physical examination for everybody at least once a year. The American Medical Association has requested the physicians of the country to equip themselves to render this examination service, and the idea is being taken up in earnest by state and county medical bodies.

Despite the rapid growth of the movement since its inception in an organized way some thirteen years ago, it is safe to predict that the field for this constructive medical service will be greatly broadened in the coming years as public education advances and as physicians equip themselves to render such a service. The institutions and doctors now specializing in health examinations cannot hope to accomplish the task

before them without the aid of reinforcements. Clearly the great bulk of the work must ultimately fall upon the general profession.

At no age is an individual too young or too old to derive real benefit from the health examination when thoroughly conducted. Intelligent advice and treatment must be based upon full knowledge of the individual and his habits. Those familiar with the subject know that such serious diseases as tuberculosis, organic heart impairment, diabetes, nephritis, cancer, and psychic disorders are frequently discovered accidentally in the course of a complete routine examination, not to mention innumerable minor defects which, if neglected, may lead to ultimate disease.

It is hoped that this volume will fill the need for a practical manual of procedure to serve as a guide to the physician in the conduct of this specialized type of medical work. It is also hoped that it will be found valuable to those who wish to acquire precision and completeness in the general diagnostic field. The condensed description of clinical and laboratory technic should appeal to medical students and hospital interns, as well as to the busy practitioner who works under pressure and who cannot always find time for free consultation of extended texts on general medicine and the specialties.

The chief merit of the Manual may be said to lie in the fact that it represents the consensus of judgment of physicians dealing with the practical problems involved in the conduct of the periodic health examination service, covering a thirteen-year experience and the examination of more than five hundred thousand lives.

In the preparation of the volume reference has, of course, been made to the best scientific literature available in checking up the material presented, and there has been a conscientious effort to give due credit for material adapted from various sources. While it has not been considered necessary to include specific detailed references, each section is accompanied by a list of text-books which will be found helpful where a fuller description of technic is desired.

The specimen forms and reports included in the Appendix (which are constantly being improved to keep pace with advances in clinical medicine) are presented for their suggestive

value to the general practitioner who desires to establish a satisfactory office system and to conduct this type of service on a high plane of efficiency.

Introductions to the various sections written by men eminent in their respective fields of medicine—to whom the authors are especially indebted for their generous co-operation—have great value in giving the physician a true perspective as to the importance in a general physical examination of thorough attention to every region of the body.

Grateful acknowledgment is here made of the painstaking work of the committee of physicians who brought together much of the original material, and of their practical suggestions as to its interpretation and integration into a consistent outline of procedure. We are also deeply indebted to Dr. J. J. Short for preparation of the section on Laboratory Methods and Standards; to Dr. R. Tunstall Taylor for advice and aid in preparing the section on the Osseous System; to Dr. R. J. E. Scott for the Index; and to Nellie Dunn MacKenzie for editorial assistance in the preparation of the manuscript.

The royalties from the book are not claimed by the authors, but are devoted to educational work in the field of preventive medicine.

Criticism and suggestions for the improvement of this volume are invited, and will be given careful consideration in connection with the preparation of future editions.

Eugene Lyman Fisk
J. Ramser Crawford

New York City,
January, 1927.

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The Periodic Health Examination
A Manual of Procedure

INTRODUCTION

THE purpose of the periodic health examination is *not* the diagnosis of so-called "disease," but the detection of physical impairment or predisposition to disease, and faults in living habits, the correction of which would have even a remote beneficial influence on the life of an individual.

The general physical state of the population has been disclosed by sickness surveys, by examinations for life insurance, for military service, and in industry. Statistics derived from these sources show that the average man presents a number of important impairments the correction of which would prove distinctly beneficial.

The aims of the periodic health examination which is directed toward correcting this condition are remedial, protective, and constructive; and in order that this work may be carried through consistently, vigorously, and with full pressure toward these ends it is important that physicians have a clear understanding of the general physical state of the population. Unless they do have this understanding their work will inevitably fall below a reasonable standard.

The common error of medical men, influenced by clinical prepossessions, is to give little attention to impairments other than those incident to advanced disease. This attitude of mind has been responsible for a great deal of failure of service in medical practice. The purpose of any individual physician or organization attempting the periodic health examination should consist not of separating the sick from the well—of determining whether an individual is "healthy" or "diseased" in the ordinary sense of the term—but of searching for and re-

cording accurately the slight impairments which are present in the subject examined, and which would ultimately lead to disease conditions if not corrected.

Obviously, thorough knowledge of clinical medicine and of physical diagnosis is essential. But the physician must bear in mind, as well, that he is seeking information upon which to base counsel as to the correction of physical defects, the regulation of hygiene, and medical supervision or observation. To this end he must plan the examination of his subject as a thorough survey of the body, including consideration of the family and personal history.

Disease, physical failure, and ultimate death are due not to time, but to definite physical causes, and it is the task of the physician undertaking this work to search the histories and bodies of his subjects for evidence of the influence of such causes, and to endeavor to correct them or to protect the individual against them. These causes may be grouped as follows:

Heredity.
Infection.
Poisons.
Food deficiency or excess.
Air deficiencies or defects.
Hormone deficiency or excess.
Physical trauma (or strain).
Physical apathy (or disuse).
Psychic trauma (or strain).
Psychic apathy (or disuse).

Apart from competent technic, the success or failure of an examining system will depend largely on whether or not it is governed and guided by the basic principles underlying the periodic health examination.

Physicians who study the statistical reports of the findings of physical examinations will appreciate that failure to find any physical defect requiring comment is usually due not so much to the physical perfection of the individual examined as to faulty technic on the part of the examiner. The importance of minor physical defects must not, of course, be overemphasized. Nevertheless, it should be borne in mind that they have their influence on the general physical state, and must be

sought for and recorded, not only as a basis of counsel to the subject, but for purposes of statistical study with a view to assisting in the propaganda for higher health standards, for a better quality of scientific work in the medical profession, and for protecting the public from the injurious influence of quacks and pseudoscientific systems. The physician must not lose sight of the fact that he is responsible for assuring a fair degree of accuracy in both the negative and positive evidence elicited by these examinations.

As this work grows it is to be expected that the physicians who assist in extending its influence will be recognized in their communities as having rendered a valuable public service.

The Examiner

There is a certain minimal standard as to technic and uniformity of procedure in making the periodic health examination that should obtain in every examining office, and it is possible for properly trained physicians to make such a survey in a very practical and valuable form. In fact, if this work is to be made universally available the groundwork must be done by the man trained in general medicine, as there are not enough specialists to meet the demand in the matter of periodic health examinations of the whole population, if specialists were used as a matter of routine in all cases. Many of the tests appropriate for the various regions of the body are simple, the technic being readily acquired by a well-grounded general practitioner. This limits the need for specialists to borderline and obscure cases where advanced technic is required. (It is wise, however, to have special examination of the eye, ear, nose, and throat if possible. Whether or not other specialists are needed will depend on the results of the general physical survey.)

The tendency to shift one region of the body after another into the realm of a specialty, even with regard to the superficial examination of that region, is responsible for much dissatisfaction on the part of the public with medical service. The physician who equips himself to make a complete survey of the human body has a long lead over those who confine themselves to the treatment of emergencies or symptoms of acute or chronic disease, and who cannot more

completely interpret the condition of their patients. Perhaps no physician is really competent to practice medicine who cannot survey the human body completely, and at least ascertain whether there is a suspicion of any defect or trouble in any region, even though further special diagnostic technic is required completely to interpret it.

The Technic of Examining

A complete fundamental physical survey can be made in from three-quarters of an hour to one hour. It should cover each region of the body as hereinafter outlined. This survey can be made the basis of counsel to the subject examined, or of action for further diagnostic investigation. With all the data in hand from the records of the family and personal history of the examinee, and from the reports of his physical survey and laboratory tests, the results of the examination can then be interpreted.

The prominent, important pathological condition should first be considered; then, the relationship of the minor defects to the prominent defects should be determined and a program outlined that will involve (1) the correction of remediable defects, (2) the supervision and mitigation of non-remediable defects, and (3) a constructive program in hygiene for the upbuilding of the body.

Loose terminology, vague and indefinite methods of technic must be avoided. The examination must be conducted in a workmanlike manner, with precision and accuracy, extending the scope of the diagnostic methods in borderline and obscure cases.

The message to the examinee, based on the examination, must always be a hopeful one. It is important that the significance of any one defect or fault in hygiene should not be overemphasized. Every defect and fault in hygiene has its influence, and must be presented, so far as possible, in proper balance. The subject should be reminded that practically every civilized individual shows impairment, and that the recognition of these impairments points the way to improved health and happiness. Properly handled, this measure prevents rather than encourages neurasthenia and groundless fear of disease.

In examining large numbers of people it is inevitable that a certain amount of mechanical routine should surround this work. Tact and patience are required to carry through the examination with proper dispatch. Every effort should be put forth on the part of the physician to make the examinee realize that the mechanical routine is simply a fundamental protective procedure wholly in his interest, and that there is a genuine human interest activating the work of the periodic health examination.

It is all-important for statistical purposes that the individuals examined be classified, as each defect has its influence on morbidity and mortality. An individual 50 pounds overweight for his type may, from a clinical point of view, be given a clean bill of health; yet he belongs in a mortality class 50 per cent. above the average. The entire program for physical examination should be grounded in these principles —classifying people as to their mortality and morbidity plane and counseling them as to moving on to more favorable planes. In addition to verbal or written counsel adequate prepared literature on the regulation of individual hygiene, etc., should be furnished the examinee with his report.[1]

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PRELIMINARY PROCEDURE

Section 1

TAKING THE HISTORY AND RECORDING THE FINDINGS

In the periodic health examination, as in general practice and hospital work, complete, accurate histories and records of physical findings are most important. These are necessary (1) in order that intelligent and comprehensive verbal or written reports may be rendered at the completion of the examination, and (2) that there may be a basis for comparison with future findings.

The personal history and medical forms herewith reproduced are the outgrowth of many years' experience in the field of the periodic health examination service.

Taking the History

There are two phases of history taking: (1) The preliminary personal history statement filled out by the examinee before the examination, covering illnesses and habits of hygiene as well as a full statement of the chief complaint, and (2) the specialized history relating to each region of the body, incorporated in the medical examination form, filled out by the physician at the time of the examination. This latter phase of the history taking by the physician serves as a check-up on the personal history statement of the subject and obviates the danger of unintentional errors which may occur through unfamiliarity with the matters touched on. It is very important, in that it supplements and clarifies the preliminary personal history statement. The physician is thus given an opportunity to describe particular phases of the history and to form his own conclusions as to whether questions having a definite bearing upon the health of the subject have been thoroughly understood and accurately answered. For example, in the

PERSONAL HISTORY

Standard Series Personal History. Section 1.

NAME _____ ADDRESS _____

AGE NEAREST BIRTHDAY years	MARRIED SINGLE WIDOWED	OCCUPATION	INDUSTRY	PARTICULAR KIND OF WORK	PREVIOUS OCCUPATION

Family Record	Age if Living	Health (Good or Bad) If not good, give full details	Age at Death	Cause of Death	How long ill	Year of Death	Details	Previous Health
Father								
Mother								
Brothers								
Sisters								
Husband or Wife								

Questions	Answers
1. A. Number of HEARTY MEALS daily (state which)	A
B. Number of LIGHT MEALS daily (state which).	B
C. Do you eat RAPIDLY, SLOWLY or in an INTERMEDIATE way?	C
D. How often do you eat MEAT?	D

2. State whether you eat SPARINGLY (S), MODERATELY (M) or FREELY (F), of the following foodstuffs:

MEAT	FISH	FOWL	EGGS	CHEESE	PEAS	BAKED BEANS	BREAD KIND	RICE MACARONI	CEREALS
BUTTER	**CREAM**	**SWEETS**	**PASTRY**	**COOKED VEGETABLES**	**RAW VEGETABLES OR SALADS**		**COOKED FRUIT**	**RAW FRUIT**	**SALT**	**PEPPER SPICES**

3. Do you ever eat RAW MEAT other than sea food? What?	3. *a*	
4. *a* How many glasses of WATER do you drink daily? *b* How many of these at meals?	4. *a* *b*	
5. How many cups do you drink daily of—	5. TEA *cups daily*	COFFEE *cups daily* / MILK *cups daily* / BUTTER-MILK *cups daily* / CHOCOLATE COCOA *cups daily*
6. What is your practice in the use of ALCOHOL? (State how much DAILY: in what quantity, and the form.)	6. BEER *daily*	WHISKEY *daily* / WINE *daily* / OTHER ALCOHOLIC BEVERAGES *daily*
7. What has been your PAST HABIT in the use of alcohol?	7.	
8. What is your practice in the use of TOBACCO? (State how much DAILY and the form.)	8. CIGARS *daily*	CIGARETTES *daily* / PIPEFULS *daily* / CHEWING TOBACCO *oz. daily*
9. Do you SLEEP well? How many hours?	9.	
10. Do you sleep in a WELL VENTILATED bedroom with windows open?	10.	
11. How many HOURS do you work each day?	11.	
12. Do you follow any special PURSUIT or RECREATION aside from business?	12.	
13. Do you secure REGULAR DAILY EXERCISE; if so, is it in the open?	13.	
14. State your habits in regard to EXERCISE as clearly as possible. (When, duration, and form?)	14.	
15. State BATHING habits.	15. WARM BATHS—how frequently?	COLD BATHS—how frequently?

Have you had any of the following diseases? Check and describe on lines below.

1. Diphtheria	7. Pneumonia	13. Heart disease	19. Asthma	25. Tuberculosis	
2. Scarlet fever	8. Pleurisy	14. Kidney trouble	20. Hay fever	26. St. Vitus dance	
3. Tonsilitis	9. Malaria	15. Abdominal operation	21. Neuritis	27. Bronchitis	
4. Rheumatism	10. Gonorrhea	16. Lung disease	22. Lumbago	28. High bloodpressure	
5. Typhoid	11. Syphilis	17. Frequent colds	23. Epilepsy	29. Diabetes	
6. Appendicitis	12. Gallstone colic	18. Kidney colic	24. Cancer	30. Paralysis	

NAME OF DISEASE	NUMBER OF ATTACKS	DATE	SEVERITY	RESULTS

Fig. 1.—Standard personal history form.

Section 2

PERSONAL HISTORY

In order to make a complete health survey it is absolutely essential to have information regarding the individual's past and present history, as there are many conditions in which the history is as important as the findings of the physical examination. This information is treated confidentially as are all our records.
This blank has been prepared in such a way that the questions can be answered in most cases by yes, or no, or a few words.

1. Did you come to the Institute to seek explanation of some symptom or condition?
or for a routine physical survey?
If for the former reason, please explain fully

2. Were you ever rejected for life insurance? Why? When?
Have you ever lived in the tropics? For how long?

3. Do you have headaches? Slight? Severe? Constant? Periodic?
When? Do you awaken with a headache? Does it appear in the afternoon?
Are they associated with constipation? How long since they first appeared?
What part of the head is affected? Are you ever nauseated as a result of the headaches?
What measures of relief have you used?
Do you suffer from vertigo or dizziness? When was it first noticed? Is it constant or periodic?
Have you received medical treatment for the condition? To what cause was it attributed?

4. Do you suffer from shortness of breath on slight exertion? When was it first noticed?
Has it increased in severity lately? Do you suffer from palpitation? When was it first noticed?
Has it increased in severity lately?
Do you have pain in the region of the heart? Is it slight or severe?
Does the pain shoot to any other region of the body? If so, where?
Is the pain brought on by exercise? Is it noticed after meals? What gives relief?
Have you noticed any swelling of the feet or legs within the last two months?
Are you apprehensive about your health? Are you annoyed by abnormal fears?
Of what? How long has this existed?
Have you ever had a nervous breakdown? When? How long did it last?
Have you ever had fainting spells? Do you have them at present?
Do you worry about your work or personal affairs? Is so, explain.

5. Do you have frequent colds? in throat. in head? in chest?
Have you a cough now? How long has it been present?
Is there any pain in the chest on forced breathing?
Have you ever spat blood?
Have you ever had night sweats? When? Have you lost weight? When?
Have your lungs been x-rayed? When? Was tuberculosis revealed? Yes or no.
Is there a history of tuberculosis infection? Lungs?

6. Is your appetite good?
Have you suffered from indigestion lately?
How long ago was it first noticed?
Is the indigestion associated with pain, burning, gnawing or definite discomfort in abdomen?
Where?
Is the pain or discomfort present when the stomach is empty?
Is it relieved by food?
How soon after eating does the pain or discomfort begin?
Do you ever feel nauseated?
Do you vomit? How long after taking food?
Have you had an analysis of the stomach contents? When?
Have you had your stomach examined with the x-ray?
What was the diagnosis?
Do you suffer from excessive gas formation?
Are you receiving treatment now? From your own doctor or a specialist?
Is your diet being regulated?

Fig. 1.—*Continued.*

7 How often do your bowels move? Freely?
When the bowels move, do you feel satisfied they have moved enough?
Are laxatives or enemas used? How often?
Have you ever had black stools? Cause, if known?
Have you ever had bleeding from the rectum or noted the passage of blood, pus, mucus, or slimelike material?
Have you had rectal pain or pressure?
Have you noted any change in your bowel habits?
Have you noted constipation alternating with diarrhea? Do you have morning diarrhea?
Have you noted any swellings about the anal region, or have lumps or hemorrhoids or masses of flesh come out after bowel movements?
Have you noted spasms at the outlet or are there tender spots in that region?
Have you suffered from itching at anus ("rectum")?

---

8 Do you arise at night to urinate? If so, how often? Cause, if known.
Do you have difficulty in urinating? Do you have any pain when urinating?
Have you noticed any increased frequency in urination lately? When?
Has your urine been examined? Year? Was it normal?
Did it show albumin? Casts? Sugar? Pus? Blood?
Do you suffer from pain or discomfort over the kidneys?
Does the pain move? If so, where to?

---

9 How long since you consulted your physician?
Enter below any further facts about yourself which you think would be helpful to the examining physician.

Please sign here_____

Fig. 1.—*Concluded.*

section on the Thorax will be found listed under the history an extended list of symptoms and diseases having a very definite bearing upon the cardiorespiratory organs.

The Chief Complaint

It is important that the physician be very discriminating in the matter of recording the chief complaint. Many individuals seeking a general physical examination begin by making the statement that they have no specific complaint. But the majority of such people will usually mention two or three complaints, if not more, before the examination is completed, even though they be of a minor nature. In this connection the physician must bear in mind the wide variation of interpretation often given by the individual to such conditions as constipation, indigestion, gastritis, etc. Many people state that they have "indigestion" because they do not have regular bowel movements; or because they have too much stomach and intestinal gas; or because they have a sensation of fulness in the abdomen after meals, or because they have pain, or because they have headaches after meals. Others, again, do *not* complain of constipation because they have one or two bowel movements a week. Some complain of "piles" because they have itching about the anus—a condition more frequently due to excoriation, fissures, pin-worms, eczema, etc.

Contact With Examinee

The physician should be extremely tactful in obtaining the history. This is particularly true with regard to venereal infection. A subject is often reluctant to divulge information with regard to this phase of the history. Sometimes the examinee becomes disgruntled at questions put to him because he fails to appreciate their importance in connection with a health examination. In fact, occasionally the physician will meet a person who refuses altogether certain parts of the examination. When this occurs it should be carefully noted and commented on at the end of the medical form. This is in the interest of a complete record and is a protection to the physician in subsequent dealings with the examinee. It serves also as a guide in handling the report. A terse statement of facts, using

well-chosen adjectives freely, is preferable to long phrases and superfluous words. It is usually advisable to state the history in the examinee's own words, using quotation marks.

The importance of a complete, carefully taken history cannot be too strongly stressed. Some clinicians have gone so far as to say that more accurate diagnoses can be made from the history alone, intelligently taken, than from the physical findings, without a history.

Recording the Findings

To secure the best results in the periodic health examination it is essential that the examining physician follow a comprehensive plan which will insure accuracy, thoroughness, and uniformity in the matter of recording the findings. The medical examination form herewith reproduced has been elaborated (1) to serve as an outline and a reminder; (2) to reduce to a minimum the writing required of the physician; (3) to permit the use of diagrams as much as possible; (4) to insure emphasis on important findings; and (5) to secure a summary of findings and a brief outline of recommendations which will serve as a guide in formulating comments and advice to the examinee.

Experience has made clear one fact, and that is, that a very *complete* examination form is desirable because of its suggestive value. If a limited form is employed, even an expert examiner may fail fully to cover the ground and effect a complete analysis of the individual's condition. In this work, as in all other human endeavor, a thorough and comprehensive method of procedure carefully outlined will prove a safeguard and in the long run protect against omissions and superficial performance.

No section of the medical examination form should be left blank. One zero (0) in the section will suffice to indicate that the ground has been covered and nothing abnormal found. When there are abnormal findings, these should be indicated by a ring drawn around the printed words which apply to the findings. The degree of abnormality should be indicated by +, meaning impairment present; ++, treatment needed; or +++, treatment urgent.

MEDICAL EXAMINATION FORM (Male)

DO NOT WRITE IN THIS SPACE
WRITE LEGIBLY IN PROPER SPACES

MALE

USE + SIGNS TO INDICATE DEGREE O NORMAL + IMPAIRMENT PRESENT ++ TREATMENT NEEDED +++ TREATMENT URGENT

1. Name ..... Address .....

Race Age .....

2. Chief complaint— Dur.

Reasons for coming to the Institute

Is individual aware of illness? Give particulars.

3. Distant Vision {Rt. / Lt. / Glasses worn {yes / no Corrected to {Rt. / Lt. Pupils {Inequality / Irregularity

Near Vision {Rt. J Lt. J Glasses worn {yes / no Corrected to {Rt. J / Lt. J Reaction {Light / Accommodation

Astigmatism Yes—No Glasses worn {yes / no Corrected Nystagmus

Fields for form Glasses or further Correction needed {yes / no Color vision

" " color Conjunctiva—

Muscle Balance Glasses not brought Date of last oculist's exam. ..... Media—

RT LT. Other Defects—

History—

Eye Strain—

Close Work—

4. Whispered voice at 10 ft. or conversational voice at 20 ft. (back turned) **EARS**

Hearing {Rt. /10 Lt. /10 Canal {Rt. Lt. Drum {Rt. Lt. Rinne {Rt. Lt.

History Weber Lateralized {Rt. Lt.

5. Nasal Septum Deviation Odor

Turbinates Nasal discharge

Sinuses Postnasal discharge

Antra Character

Unilateral or bilateral

Tonsils | Enlarged | Buried | Cryptic | Septic | Removed {Date..... Remnants History—Discharge (type)—

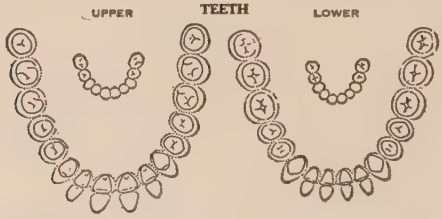
Frequent colds

Naso-Pharynx

Oro-Pharynx Asthma {Has protein sensitization / Hay fever {been done?

Uvula Larynx

6. UPPER TEETH LOWER



D-Decay
F-Filled
C-Capped
Cr-Crowned
R-Roots
B-Bridge
M-Missing
O-Cavities
P-Pyorrhea
X-Recession
L-Loose
I-Infected
T-Tartar
S-Pivot teeth
H-Pulpless teeth

GUMS
Anemic
Bleeding
Infection
Markings
Discharging Sinus
Odor
TONGUE

Ever x-rayed? When? X-Ray advised this year? Yes No

Findings action taken

7. General Appearance: Excellent—Good—Fair—Poor. Bones for height {Light—Medium—Heavy

Nutrition {Good / Underweight / Overweight Color of Hair..... Hemoglobin.....gms.....%

Height net in. Weight, net lbs. Maximum wt. When

Chest {Rest in. / Insp. in. / Exp. in. Abdomen in. Recent gain.....

Recent loss .....

Cause .....

Stem Height V Cap. Exp. Force Sus. Test

Fig. 2.—Standard medical examination form (male).

8. **CIRCULATORY SYSTEM**

Pulse

Rate (sitting)

Large—Small—Strong—Weak

Regular—Irregular

Rate (immediately after exercise)

Rate (2 minutes after exercise)

Temperature

..... °

Blood-Pressure

Systolic (Before exercise) Diastolic

Systolic (2 minutes after exercise) Diastolic

Sinus Arrhythmia
Extrasystoles
Heartblock
Auricular Fibrillation
Paroxysmal Tachycardia
Auricular Flutter
Pulsus Alternans
"Pistol shot" femoral
Visible Carotid
Pulse deficit
Edema of ankles

Arteries Calibre **Thickening** Radials | Brachials | Temporals | Others

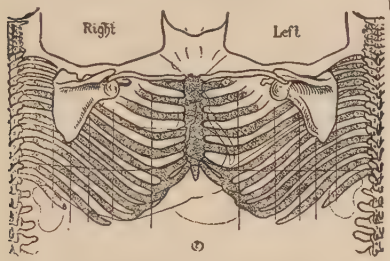
9. **THORAX**

Heart and Lungs

Apex .....int. space.....in. from midsternal line.
Enlargement—no—slight—moderate—marked
1st sound at apex—clear—distant—dull—loud
Murmurs—Point of intensity
Systolic Diastolic Presystolic
Quality
Area of Transmission
Heard {Lying down / Before or after exercise / During held inspiration}
Apparently - functional—organic {Insufficiency / Stenosis}

Visible, Palpable, Thrill, Heavy, Tapping
Palpation supra-sternal notch
Tracheal tug
Aorta width at 2nd space
Aortic—2nd Pulmonic 2nd
(Indicate accentuation by + or + +)

History of:—Dyspnoea, edema, palpitation, night start, cyanosis, angina, vertigo, syncope, rheumatism, epistaxis, chorea, syphilis, acute infectious disease, nephritis, cough, bloody sputum, fever, asthma, night sweats, pneumonia, influenza, pleurisy, bronchitis, prolonged illness of heart or lungs.



Type of Chest—Normal—barrel—funnel—pigeon
Inspection:
Palpation. Fremitus: increased—decreased (location)
Percussion. Impaired resonance—dullness—flatness (location)
Auscultation. Breath Sounds: absent—distant—vesicular—broncho-vesicular bronchial—amphoric—cavernous.

Râles heard {During inspiration..... / End of inspiration..... / During expiration ..... / After coughing .....}

Type of râles.....

10. **ABDOMEN**

Shape: Normal—scaphoid—pendulous

Wall: Normal—fat—thin—tense—lax
Tympanites: Location: .....
Fluid: Free—confined
Tenderness: Location: .....
Transmitted to: .....
Liver: Enlargement.....
Consistency.....
Spleen: Palpable Not palpable
Kidneys: Palpable Not palpable

History:
Appetite .....
Constipation .....
Jaundice .....
Acidity .....
Flatulence .....
Diarrhea .....
Parasites ..... Blood .....
Pains {Location ..... / Radiation ..... / Relation to meals..... / Nausea and Vomiting.....}

Masses: (Use Chart)
Size .....
Location .....
Consistency .....
Movability .....
Tenderness .....

Hernia {Epigastric / Umbilical / Ventral / Femoral}

DO NOT WRITE IN THIS SPACE

Fig. 2.—*Continued.*

DO NOT WRITE IN THIS SPACE

11. **BRAIN AND NERVOUS SYSTEM**

Romberg
Patellar—normal—increased
sluggish **absent - unequal**
Ankle Clonus
Babinski
Speech
Station
Gait
Incoordination
Atrophy

Tremors, coarse, fine intention {Fingers / Tongue}

Psychoneuroses
Psychoses
Prevailing mood—depressed - gay **suspicious - irritable - sulky** - apprehensive - resentful

Heredity
Personal history of—
Nervous affection
Syphilis

12. **ENDOCRINE SYSTEM**

Thyroid,
Enlargement—slight - definite - marked
diffuse lobe
Skin signs
Pigmentation Hair distribution
Pituitary Weight distribution
Testicle Sexual changes
Suggestive traits of personality

Hyper—Hypo—Function
Type of change {Cystic—Adenomatous / Parenchymatous, etc.}
Exophthalmos Tremor

Need for {Basal Metabolism? / Therapeutic diagnosis?}

13. **SKIN and LYMPHATICS, VEINS, (Use Charts)**

Lymphatics
Varicose Veins—slight - moderate - marked
Skin Changes
Hair
Nails

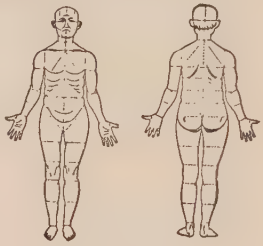
Need for {Treatment? / Stocking?} Worn?

Vaccinated or had Small-pox?
Innoculated or had Typhoid?

14. **POSTURE, SPINE, EXTREMITIES and FEET**

Posture—Sitting
" —Standing
Feet
Depressed **long. arch:** 1°—2°—3°
Pronation—toeing out
Pain in back—legs
Depressed **trans. arch:** 1°—2°—3°
Callus—pain in feet
Toes—Hammer
—Over-riding
—Hallux Valgus
Corns Bunions
Shoes: correct—incorrect

Muscles {Firm / Moderate / Flabby}
Spine—Rotation
Lordosis
Scoliosis
Kyphosis—Angular
Gradual
Rigid
Flexible
Joints—Swollen
Crepitant
Ankylosed
Partially Ankylosed
Fascia Changes



15. **INGUINAL**

External Rings	**Hernia**	Type	Need for {Operation? / Truss?}
Right	Right		Truss worn?
Left	Left		Is it satisfactory?

16. **GENITO-URINARY**

Penis
Urethra
Testicles
Epididymis
Seminal vesicles

Prostate
Enlarged
Symmetrical
Irregular
Hard
Tender
Boggy

Varicocele {Rt. / Lt.}
Hydrocele
Need for {Treatment? / Suspensory?}
Is suspensory worn?
Health of wife
Children Living **Dead**
Wife Miscarried?
Cause?

History of
Hematuria Kidney pain **Calculus** **Cystitis** **Stricture**
Changes in Sexual function
Frequent—difficult—painful urination
Polyuria {Diurnal / Nocturnal}

Fig. 2.—*Continued.*

17. **RECTUM**

Hemorrhoids: Tabs — External — Internal — Bleeding — Pruritus

Fissures **Fistula**

Sphincter: Normal—Tight—Relaxed—Prolapse

18. **VENEREAL**

Gonorrhea date.....Treated?.....Complications? {Epididymitis / Prostatitis / Stricture / Rheumatism}

Chancroid.

Syphilis date.....Treated {Hg— / 606—}

Wassermanns When Result

19. **SUMMARY**

General Condition (Vitality) Excellent Good Fair Poor Feeble

List below the important physical findings and errors in hygiene that should be considered or discussed in the final report to the member.

PHYSICAL FINDINGS	HYGIENE CORRECTIONS
1.	.....
2.	.....
3.	.....
4.	.....
5.	.....

What are probable factors causing the chief complaint?.....

.....

.....

List conditions needing medical supervision.	List below investigations necessary. Why?
1.	1. .....
2.	2. .....
3.	3. .....
4.	4. .....

20. Special Notes, Check-up Memoranda, etc.
Discuss factors of chief complaint.

.....

.....

.....

.....

.....

.....

Examined by .....

Date .....

DO NOT WRITE IN THIS SPACE

Fig. 2.—*Concluded.*

The findings should be filled in in the examination form in the following order:

Section 3—*Eyes.* In this section the findings brought out in the physical examination of the eyes are recorded, including near and distant vision, color vision, condition of the pupils, eye-grounds, etc.

Section 4—*Ears.* This section provides for testing the hearing of each ear, and for recording the findings brought out by examination of the canals and ear drums.

GENITO-URINARY

Mammary Glands: Masses (present):
Nipples: retracted—prominent—secretion
History of growth:

Vulva..... **Vagina**.....**Perineum:** Laceration **Cystocele.** **Rectocele**

Discharge: scant—moderate—profuse—serous—mucoid—muco-purulent—purulent—sanguinous.
Apparent source?

Cervix
Shape..... Pointing..... Size.....
Mucosa: congested—eroded—ulcerated. Lacerations: extent—unilateral—bilateral—stellate.
Growth—polyp. Describe.

Uterus
Size..... Position..... Mobility.....
Mass: Location..... Size..... Mobility.....
Character

Appendages .....

Menopause .....Any bleeding since?.....

Menstrual history:—Age when menses began.....
Regular..... Irregular.....
Interval..... Duration.....
Flow: Scant—moderate—profuse. Pain?.....
Date of last menstruation.....

Pregnancies: uneventful—toxemic—complicated.

Labors: easy—difficult—operative—sepsis following.

Children: living.....dead.....miscarriages.....cause.....

Gynecological treatment?

History of: Hematuria Kidney pain Calculus Cystitis
Changes in Sexual function
Frequent, difficult or painful urination
Polyuria {Diurnal {Nocturnal

Fig. 3.—Gynecological section from standard medical examination form for females. (Form otherwise same as one for males.)

Section 5—*Nose and Throat.* Provision is made in this section for recording any abnormalities found involving the different structures of the nose, the nasal accessory sinuses, the pharynx, and the tonsils.

Section 6—*Teeth.* The upper and lower dental arches are diagrammed in this section, showing both the deciduous and the permanent teeth. The physician may cover conveniently and accurately such findings as "cavity," "crown," or "miss-

ing," by merely entering on the diagram on the tooth involved the code letter covering the condition found.

Section 7—*General Appearance.* This section provides for a gross general description of the subject, including nutrition, height and weight, color of hair, size of bones, etc.

Section 8—*Circulatory System.* This section provides for recording the temperature, the pulse, and blood-pressure both before and after exercise, and findings relating to the condition of the arteries and irregularities of the heart.

Section 9—*Thorax.* This section provides for recording the findings relating to the organs contained within the thorax. Descriptive terms are included covering abnormalities of the heart and lungs.

Section 10—*Abdomen.* This section covers abnormalities of the abdominal organs and the different hernia which may involve the abdominal wall, such as epigastric, umbilical, and ventral.

Section 11—*Brain and Nervous System.* Provision is made in this section for recording findings covering such matters as reflexes, gait, and co-ordination.

Section 12—*Endocrine System.* This section contains descriptive terms covering the findings relating to the endocrine system.

Section 13—*Skin, Lymphatics, Veins.* This section provides space for recording abnormalities of the skin, lymphatics, and veins.

Section 14—*Posture, Spine, Extremities, Feet.* This section contains descriptive terms relating to abnormalities involving the spine, the feet and legs, joints, and posture. It also provides a diagram for the purpose of accurately noting the location of abnormalities found.

Section 15—*Inguinal Region.* This section provides for the recording of findings relating to the condition of the external abdominal rings; whether they are normal in size or relaxed. When hernia is found, provision is made for recording the type; also whether a truss is worn and if so, whether it fits properly.

Section 16—*Genito-urinary System.* This section contains a list of the various genito-urinary organs, so that abnormalities found may be recorded.

The corresponding section in the form for the examination of females contains, in addition, descriptive terms covering the findings relating to the mammary glands and the perineum.

Section 17—*Rectum.* This section provides for recording findings relating to such conditions as hemorrhoids, fissure, fistula, and the condition of the sphincter muscle.

Section 18—*Venereal Disease.* This section covers matters of history relating to veneral conditions.

Sections 19 and 20—*Summary, Special Notes, etc.* These sections provide for a summary by the physician of the main items brought out in the course of the examination—the various conditions requiring medical supervision, the supplementary investigations and special tests that may be needed, and the faults of hygiene to be corrected. A statement covering the examiner's opinion as to the cause or causes of the chief complaint is of great importance.

Obviously, an adequate summary by the examining physician is of the utmost importance. The findings recorded in this section of the examination form furnish an excellent index as to the examiner's accuracy of observation, his powers of analysis, his judgment as to relative values, and confidence in his own findings. From his summarization it will be apparent whether the physician understands the basic principles underlying the periodic health examination. The careful examiner will include in his summary a suggestion as to the type of individual examined, recent events in his life, evidences of neurotic tendencies, indifference to advice on proper care and hygiene, a too sanguine attitude in the face of obvious impairment, lack of self-confidence, domestic or business worries, and the like. Such a record is of value to the physician in connection with future examinations of the subject, as well as to the medical reviewing staff in medical centers, where the impressions of the examining physician are of great assistance in the preparation of the final report.

SECTION 2

HEALTH EXAMINATION EQUIPMENT AND ROUTINE PROCEDURE

EXPERIENCE has shown the following to be the equipment necessary for properly performing the basic periodic health examination.

Fig. 4.—Section of general examining room—periodic health examination unit established in the Museum of Hygiene of New York University (338–340 East 26th Street). The illuminated charts shown for testing the vision are read from the adjoining dark room at a distance of 20 feet.

The general examination room should contain:

Adjustable table supplied with leg or foot holders for pelvic examination; leather pad covering for table.

Foot stool.

Weight scales.
Rod for taking height.
Tape measure.
Dynamometer.
Mercury sphygmomanometer.
Stethoscope.
Thermometer.
Percussion hammer.

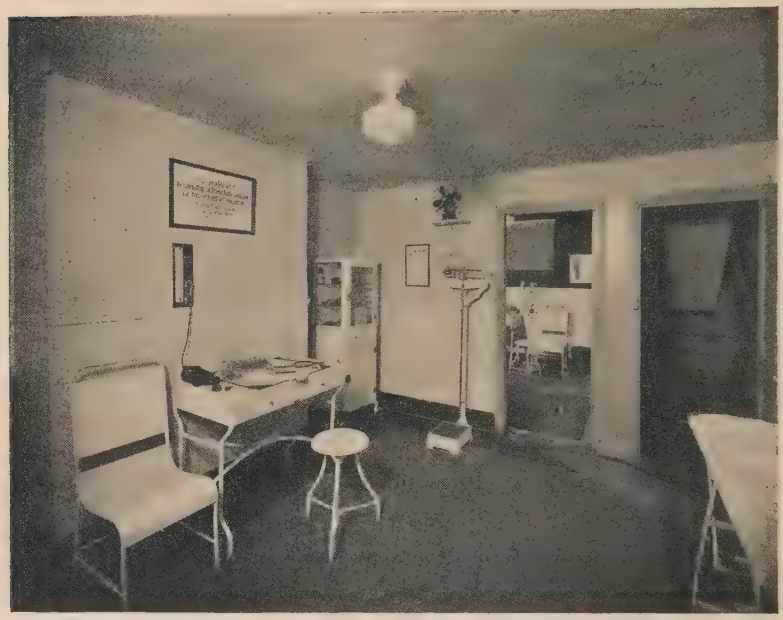


Fig. 5.—Section of general examining room with eye, ear, nose, and throat room adjoining—periodic health examination unit established in the Museum of Hygiene of New York University (338–340 East 26th Street).

Five-pound dumbbell.
Ten-pound dumbbell.
Snellen's type chart for distant vision.
Jaeger's type chart for near vision.
Astigmatic chart.
Picture chart for children and illiterates.
Special bracket reflecting wall lamp for illuminating vision test cards.

Skin pencil.
Hand magnifying glass.
Vaginal specula.
Hemoglobinometer.
Portable goose-neck floor lamp with reflector.

The dark room (eye, ear, nose, and throat) should contain:

Adjustable bracket wall lamp with condensing lens attached.

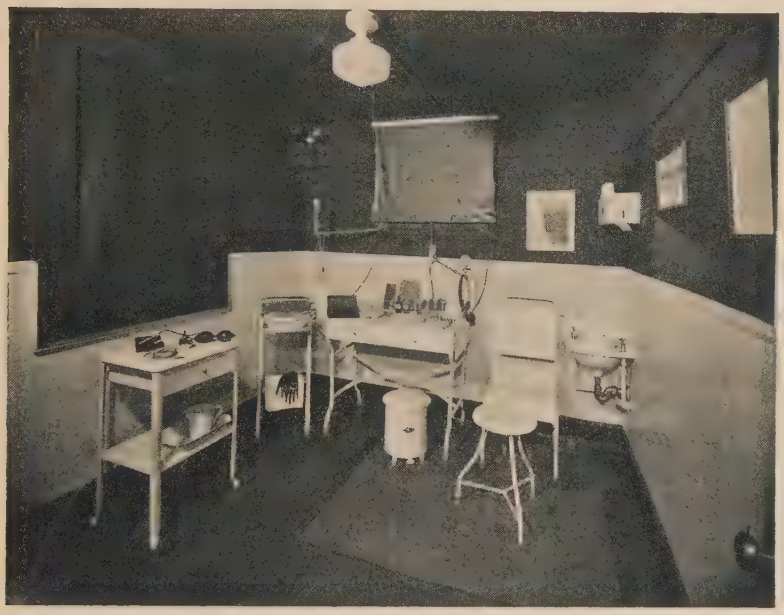


Fig. 6.—Dark room with equipment for examining eye, ear, nose, and throat—periodic health examination unit established in the Museum of Hygiene of New York University (338–340 East 26th Street).

Mirror and head band.
Electric sterilizer.
Sanitary waste containers.
Color vision test cards.
Electric ophthalmoscope.
Ten power loupe.
Electric flashlight.

Ear specula (assorted sizes).
Nasal specula (assorted sizes).
Noise apparatus for testing hearing.
Tuning-forks.
Laryngeal mirrors (assorted sizes).
Lamp for transillumination.
Spirit lamp.

Following is a list of the necessary supplies:

Glass syringe, 20 c.c., with assorted needles for taking blood specimens.
Wooden tongue depressors.
Wooden applicators.
Sheets.
Ponchos.
Rubber gloves.
Finger-cots.
Dental gauze.
Absorbent cotton.
Specimen containers (sputum, blood, urine).
Sterile tubes with media for taking cultures.
Tincture of iodin.
Denatured alcohol.
Urinometer.
Litmus-paper.
Benedict's solution.
Roberts' solution.
Test-tubes.
Filter-paper.
Glass microscopy slides.
Lubricant.
Soap.
Towels.

Routine Procedure

A systematic order of procedure in the conduct of the periodic health examination is of great value. A routine, consistently followed in each case, obviously not only facilitates the examination, but assures that no region of the body will be overlooked and that a complete record of the physical findings will be made available.

Men are examined stripped of clothing, while women are provided with a specially designed poncho (Fig. 7) which slips over the head and covers the shoulders and body to the knees. The poncho in no way interferes with the technic of the examination; at the same time it gives the examinee a sense of protection and lessens embarrassment.

Fig. 7.—Diagrams showing poncho used in examination of women. The garment is made from heavy muslin or sheeting, 1 yard wide and 3 yards long. The opening for the head should be large enough to allow for such adjustment as may be necessary in order to examine the heart and chest as well as the back of the thorax.

The individual physician may, of course, develop his own routine which may vary as to details from the procedure herein suggested. The following outline, however, is considered valuable as an aid to the physician who wishes to organize for this type of service, since it is the outgrowth of many years' experience in conducting health examinations:

1. *Subject* **standing.**

Take height, weight, measurements, note frame, record loss or gain in weight and cause.

Fig. 8.—Taking the height. Experience shows that the apparatus illustrated is the most satisfactory and reduces to a minimum the inaccuracies and inconsistent records which frequently result from less careful methods.

2. *Subject* **seated.**

Get chief complaint and related history.

The following history should be covered at this time:

Serious illnesses,
Operations,
Marital history,
Venereal history,
Vaccination—typhoid, smallpox,
Heart,
Lungs,
Digestive tract,
Nervous system,
Urinary tract.

3. *Subject still* **seated.**
   Examine mouth, chart teeth, and get history pertaining to previous *x*-ray of teeth.
   Examine nose, throat, and ears; test hearing.
   Examine eyes—distant vision (Snellen chart); near vision (Jaeger chart); pupillary reflexes and eye-grounds; color vision.
   Take temperature } at the same time.
   Take pulse (both wrists) }
   (Compare right with left radial pulse.)
   Take blood-pressure (auscultatory method).
4. *Subject* **standing.**
   Examine thorax (heart and lungs).
5. *Subject* **exercised** (functional test of heart and blood-pressure).
   Take pulse immediately after exercise.
   Auscultate heart—*standing.*
   Palpate and inspect heart area—*standing.*
   Auscultate heart—*lying down.*
   Subject **seated.**
   Take blood-pressure two minutes after exercise.
   Take pulse two minutes after exercise.
6. *Subject* **recumbent.**
   Examine abdominal wall and abdominal contents.
   Arterial system.
   Inguinal region in recumbent position.
   Lymphatic system.
   Endocrine system.
   Nervous system—abdominal and cremasteric reflexes, biceps, triceps, and other tendon reflexes.
7. *Subject* **seated** *on* **side of table.**
   Nervous system—patellar and Achilles' reflexes, ankle-clonus, Babinski, Oppenheim.
8. *Subject* **standing.**
   Romberg test and tests for co-ordination.
   Skeletal system (bony framework, musculature, deformities, posture, etc.).
   Skin (scars, moles, vaccination marks), varicose veins.
   Hernia.

9. *Subject* (*male*) **standing.**
   Scrotum, rectum, and prostate.
   Subject (*female*) **recumbent.**
   Pelvic organs and rectum.
10. Subject questioned for items of history not previously obtained.
11. Summary of case carefully filled in, including probable factors causing chief complaint and recommendations for supplementary investigations.

REGIONAL EXAMINATION

Section 3

THE MOUTH

Introduction by Alfred C. Fones, D. D. S.

The condition of the mouth, as the gateway to the human body, is now recognized to be of vital importance to the health of every individual, and therefore must be carefully studied in its correct relation to every complete physical examination.

There are several phases of mouth pathology which may produce a detrimental action either locally or systemically, but the following three conditions are most prevalent and probably the most serious: (1) Insanitary mouths, with decayed teeth and decomposing food, (2) diseased pericemental tissues, (3) devitalized and infected teeth.

When it is realized that but a small percentage of our people use a tooth-brush, the picture of the insanitary mouth cannot be overdrawn, nor can the great prevalence of such mouths be overestimated. Inflamed and congested gum tissue, broken down and decayed teeth, green and brown stains, calcareous deposits, and decomposing food débris—these mouth conditions are the rule and not the exception. The evil influence of the immense numbers of bacteria in such mouths is noticeable on the tonsils, the pharynx, and the gastro-intestinal tract. The toxic influence of unclean mouths frequently produces headache, malaise, dizziness, imperfect vision, slight fevers, diarrhea, and impaired nutrition. And these minor ailments can only be considered as secondary to the dangers of systemic infections which are frequently produced by the actual penetration of the bacteria through the tonsils and intestines.

The next factor is that of the inflamed and diseased tissues supporting the teeth. For quite a number of years dental pathologists have repeatedly called attention to the dangers

of these pericemental infections as a probable cause of systemic disease, and since the definite demonstration of the network of lymphatic vessels in the pericemental tissues, even to the extreme borders of the gingiva, there can be no doubt of the ingress of bacteria through these vessels into the blood-stream and their subsequent localization in some of the other tissues of the body. There is much scientific and clinical evidence to prove that pyorrhea alveolaris is the cause of systemic infection which may be produced in three ways: (1) By the constant exudation of pus in the mouth and thence into the digestive tract; (2) by the absorption by the lymphatics of the bacteria and their toxins present in the deeper areas of the infected tissues; (3) by the pumping action of loose teeth in their sockets during mastication, forcing bacteria and their toxins into the capillaries, and thus into the blood-stream itself.

It has been estimated that more teeth are lost from pyorrhea alveolaris than from dental caries. The medical man must realize that the gingival borders present an area eight times greater than that of the crypts of the tonsils, and that in the average mouth the gums are congested and bleeding. This provides the ideal culture-medium for bacteria.

The third phase for consideration is proving even more serious than the first two, for the *x*-ray reveals infected areas within the bone tissue at the apices of the roots of the teeth. These apical infections are found chiefly upon teeth with non-vital pulps and have remained so long undiscovered because the action of the Streptococcus viridans is so subtle and produces no local soreness, pain, inflammation, or pus.

Our research workers have clearly demonstrated that, under certain conditions, the Streptococcus viridans in the apical infection becomes aggressive and migrates, developing a selective action which varies in affinity for different tissues of the body, and the work of Billings, Rosenow, Hartzell, Thoma, and others has proved that they are the cause of many of the most serious systemic infections, especially those involving the heart, the kidney, and the joints.

It has also been claimed that there is a definite relationship between oral infection and certain types of nervous and mental diseases. This is still debatable ground.

The *x*-ray has supplied abundant clinical evidence of the appalling prevalence of apical infections, and it is not necessary to review the long list of secondary infections that have been directly attributed to these primary foci. It can, however, be truthfully stated that because they are so prevalent they are one of the most serious menaces to health.

A thorough examination of the mouth, both visual and radiographic, will invariably reveal conditions of great importance to the individual in the maintenance of general as well as mouth health. The ability of the examiner to recognize early departures from the normal in both the soft and hard tissues of the mouth presents the most valuable service that can be rendered to a patient, and offers the opportunity for suggesting educational and preventive measures which, after all, constitute the chief benefits derived from periodic health examinations.

Examination of the Mouth

Examination of the mouth is best made with the subject seated facing the light. Where consideration of color is important (cyanosis, pallor, etc.) no light is so satisfactory as daylight. For convenience, however, in examining the oral cavity it will be necessary to use artificial illumination, and this may be used in two ways: (1) direct, by using a small penlight with the left hand while the mouth is carefully inspected, using the tongue depressor with the right hand; or (2) by the use of indirect or reflected light, as when the head mirror is used.

The head mirror selected should be about $2\frac{1}{2}$ inches in diameter, and the hole in its center should be at least $\frac{5}{8}$ inch in diameter. It should have a focus of about 12 or 14 inches and should be so adjusted that the entire mouth can be examined without continually having to readjust the mirror. In right-handed examiners the mirror is best used before the left eye. An electric lamp with condenser placed near the right ear of the subject furnishes the most satisfactory illumination.

Lips

With the teeth approximated, the lips should now be examined. The appearance and the color of the lips are im-

portant. Look for a bluish tinge, denoting cyanosis, and for pallor, denoting anemia. In women, because of the custom of using cosmetics to heighten color, retract the lips with the tongue depressor and examine the inner mucosa for pallor. If anemia is suspected, the conjunctiva should then be examined for purposes of confirmation.

The lips are now inspected for ulcerations, fissures, tumors, nevi, chancre, mucous patches, herpes, etc. Such congenital maldevelopments as clefts should be noted. The labial frenum is also inspected, as it is commonly the site of troublesome ulcerations (cankers).

Tongue

The subject is asked to open the mouth widely and protrude the tongue as far as possible, when the following points should be noted:

1. Is tremor present, and does it involve the entire tongue or simple fibrillary twitchings only?
2. Does the tongue protrude in the midline or does it deviate to one side?
3. Is the tongue large or small, symmetrical?
4. Note hemiatrophy, atrophy, and edema.
5. Examine the edge of the tongue throughout and note color.
6. Note presence and character of coating.
7. Is the tongue moist or dry?
8. Is the tongue irregularly marked with deep sulci (geographical tongue, not abnormal)?
9. Examine the papillæ. (They are arranged in inverted V formation and should be easily visible.) Are they normal, swollen, inflamed, or atrophied? If there is atrophy of the papillæ, this is an important condition to note. (The sense of taste is considered in Section 10, The Nervous System.)
10. Note the presence of irregular circinate white patches on the dorsum and sides of the tongue (leukoplakia, simple or luetic, or psoriasis).

The tongue is also examined for tumors, ulcerations, nevi, scars, etc. Elevate the tongue with depressor and examine the under surface. Note condition of frenum (common location of canker). Inspect exit of sublingual ducts.

(The condition of the lingual tonsils is considered in Section 4, Nose, Throat, and Ear.)

Buccal Mucosa

Next examine the buccal mucosa throughout its entirety, using the tongue depressor. Look for ulcerations, mucous patches, etc.

The papillæ of Stenson's duct (opposite the second molar of the upper jaw) should be examined for ulcerations, obliteration, etc. Sometimes the duct is occluded by a salivary calculus, which might be felt between the fingers.

In children one must watch for Koplik spots.

Small, buff-colored elevations (misplaced sebaceous glands—Fordyce) are frequently found involving the mucosa of the mouth, particularly in the region of the lower third molars. Abnormal pigmentation and petechial hemorrhages should be looked for.

Roof of Mouth

The entire region of the hard palate should be inspected and any abnormality noted. Malformations in shape, such as extreme narrowing of the arch, and the presence of such developmental defects as exostoses of the median raphé, should be recorded. Describe clefts in the hard and soft palate.

Now inspect the soft palate. The subject is asked to say "ah," when paralysis will be seen if present, the uvula being drawn to the normal side. Look for ulcerations, tumors, pigmentations, exudative patches, perforations, and membranes. Both diphtheria and Vincent's angina may involve the soft palate. If the uvula is abnormally long, enlarged, bifurcated, or edematous, it should be so recorded. Among other things bulging of the soft palate may represent hematoma, tumor, peritonsillar abscess, or aneurysm. Edema of the soft palate should be noted. Petechial hemorrhages may sometimes be found in the soft palate even when a careful search for them elsewhere has proved negative. Excessive pigmentation is frequently present in Addison's disease.

Floor of Mouth

The floor of the mouth is now carefully inspected. Retract the tongue to one side and search for ulcerations and tumors. If ranula is suspected, the floor of the mouth should be carefully palpated with the index-finger in the mouth and the thumb beneath the jaw. In this way the size of the tumor can be estimated.

Fig. 9.—Examining the floor of the mouth by retracting the lip to one side and at the same time depressing the tongue to the other in order to make exposure complete.

Teeth

The teeth should be carefully inspected and charted. Plates or removable bridges must be removed before the teeth are examined. If details are not to be overlooked, system must be followed throughout.

It is well to begin with the region of the lower left molars. The buccal mucosa is retracted with the tongue depressor. The teeth are examined for fillings, cavities, erosions, caps, pivots, bridges, malformations, malocclusion, malposition, etc.

Now in succession examine the molars, bicuspids, cuspid, incisors, and, on the opposite side, the cuspid, bicuspids, and molars. Follow the same routine with the upper set.

All teeth missing, whether because they have been extracted or because they are unerupted or impacted, should also be indicated on the chart. The presence of stain or tartar should be recorded.

Now inspect the lingual and palatal surfaces of the teeth carefully. At times the palatal roots of the molars are completely exposed, and should be noted.

Fig. 10.—Examining the teeth and gums, using two tongue depressors, one of which should be pressed upon the gum to disclose whether infected material exudes. (The examiner should not be misled by food particles.)

All teeth should be tested with the tongue depressor to determine if they are abnormally loose. The grinding surfaces must be carefully inspected. Presence of Hutchinson's teeth (screw-driver, peg-like, permanent upper central incisors with crescentic edges) and of the ridged teeth of rickets should always be recorded.

Gums

In the same manner the gums are systematically examined. Note the presence and amount of retraction, the presence of redness at the gum margin (gingivitis), and ulcerations.

Press the gum firmly against the teeth from both sides and observe if pus exudes (pyorrhea). The mere presence of food

in the crevices does not signify pyorrhea; but it is a source of danger and may be a forerunner of pyorrhea.

Note the presence of bleeding. See if plates and bridges fit properly or if they cause irritation.

Examine the gum margin for pigmentation (lead poisoning —blue line; copper poisoning—green line). Remember that blue lines in negroes ordinarily do not have the same significance.

Epulis, nevi, tumors, ulcerations, cysts, canker, fistula, etc., should be noted when present.

The Breath

Note the character of the breath (putrid, ammoniacal, acetone, uremic). Offensive breath is usually caused by diseased tonsils, decaying teeth, pyorrhea, bronchiectasis, atrophic rhinitis, and pulmonary gangrene. It is important to determine whether the mouth or the nose is at fault. This is easily accomplished by having the subject exhale alternately through mouth and nose while the comparison is being made. If the breath is equally offensive in both instances, then one must assume that the part at fault is below the epiglottis.

Supplementary Investigations

More than 65 per cent. of supposedly normal, healthy adult individuals have one or more teeth or root particles with areas of infection about them[1]; hence, complete *x*-ray examination of the teeth should be a routine matter, repeated yearly. Moreover, individuals from whose mouths all teeth have been extracted should have the entire alveolar system, upper and lower, *x*-rayed in order to determine the presence of retained root particles, which are frequently infected.

Detailed instructions are here presented as to supplementary investigation considered necessary or advisable in a complete examination of this region:

x-Ray of teeth and jaws:

In all cases of pulpless teeth, decay, or repairs.

After complete extraction, to determine presence of infected root particles.

[1] Extending the Health Span and Life Span After Forty, by Eugene Lyman Fisk, Medical Times, June, 1923, p. 131.

History of facial neuralgia, when malposed, impacted, or supernumerary embedded teeth are suspected as a cause.

Tumors of jaw.

History of rheumatism, neuritis, or evidence of focal infection.

Blood Wassermann test:

Ulcerations, mucous patches, leukoplakia, gummatous indurations, and perforations, Hutchinson's teeth, atrophies involving tongue or taste-buds, and unexplained paralysis.

Jaw tumors.

Microscopy:

Ulcerations, exudations, and membranes.

Cultures:

Ulcerations, exudations, and membranes.

x-Ray of lungs:

When ulcerations appear to be tuberculous.

Other special tests which may be called for are:

Blood-sugar determination—Acetone breath.

Complete blood-count—Pallor of tongue, glossitis, petechial hemorrhages, anemia.

Blood-cultures—Petechial hemorrhages.

Examination of the red cells for stippling, chemical examination of urine—Lead line.

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Section 4

THE NOSE, THROAT, AND EAR

Introduction by John McCoy, M. D.

Careful examination of the nose, throat, and ear is of the utmost importance to those of us who seek to eliminate conditions which decrease longevity.

Nature in this region paints a picture which, if skilfully interpreted, offers a clue to pathology or impairment of function in almost every other portion of the human machine.

The color of the mucous membranes guides us to important deductions. Anemia indicates to us a primary reduction of the essential elements of that most important liquid tissue of the body—the blood; or shows us the result of some serious depleting process. A bluish hue indicates a failing circulation or some process interfering with it. A beefy redness may reflect intestinal toxemia, an insidious source of organic damage. In chronic lesions of the throat and nose extreme redness without pain suggests syphilis; extreme pallor with pain suggests tuberculosis; extreme redness with pain suggests malignancy.

Focal infection, which is probably the greatest factor in reducing longevity, is found here perhaps more frequently than in any other part of the body. Therefore we must make a most thorough examination of the tonsils, adenoids, accessory sinuses, middle ears, and teeth. In the opinion of the writer chronic focal infection predisposes the subject to acute inflammation of every part of the respiratory tract and thus acts as a double-barreled gun. It lowers the resistance to acute respiratory tract inflammations, such as pneumonia, mastoiditis, sinusitis, etc., and also condemns the patient to the slow poison effects of the toxins on the vital organs of the body.

Of the sources of focal infection the tonsils present the most frequent locality, and at the same time the greatest difficulty in establishing them as chronic sources of infection. To deter-

mine a diseased condition in them we must examine them locally by *pressure, suction,* and *culture,* all of which are at times insufficient, so that we are forced to a diagnosis by a process of exclusion. In other words, in patients suffering with neuritis, arthritis, deficient hearing, cardiac conditions, etc., we must look with strong suspicion upon the tonsils if all other sources of focal infection have been ruled out.

In examining the ears there are three symptoms which stand out prominently as factors in health and longevity. These are deficient hearing, discharge from the ear, and dizziness.

When the hearing is deficient, for reasons which are not plainly obvious, we must suspect hidden focal infection and search for it. Also we must always think of syphilis as another possible factor. In testing the hearing of one ear it is not sufficient to close the opposite ear with the finger, as sound is carried by bone conduction. The Bárány noise apparatus should be used in order to absolutely exclude the other ear.

The presence of long-standing discharge from the ear indicates a chronic focus of infection and also the very serious possibility of bone involvement close to such vital structures as the brain and labyrinth. Many subjects have chronic suppuration of the ear without being aware of it. Frequently only a drop or two of foul-smelling pus is present, and this is looked upon by the individual as only a slight moisture in the ear. Such indications merit very careful investigation.

Dizziness as a symptom coming from the ear is usually the result of either one of two conditions: (1) a direct extension of a suppurative process from the middle ear and mastoid to the nerve terminals of the vestibular branch of the auditory nerve in the semicircular canals, or (2) a toxic infection of the auditory nerve itself caused chiefly by chronic foci of infection in the teeth, tonsils, sinuses, or intestinal tract.

Examination of the Nose, Throat, and Ear

Before beginning the examination the past and present history of the nose, throat, and ear should be recorded. Inquire as to:

1. Changes experienced in the sensation of smell.

2. Nasal obstruction—How long has it existed? Does it consistently involve one side of the nose, or does it alternate?
3. Nasal discharge—Is it unilateral? If so, which side?
4. Head colds—Are they frequent?
5. Hay-fever and rose colds.
6. Dry mouth—Is it caused by mouth breathing?
7. Sore throat and tonsillitis—Of frequent occurrence?
8. Quinsy.
9. Laryngitis—Have there been recurring attacks?
10. Operations on nose (especially important in cases where perforation of the nasal septum is found).
11. Tonsils—Have they been removed?
12. Impairment of hearing—Is the subject aware of any impairment of hearing? When first noticed? Which ear is involved? Are noises or buzzing sounds heard, and in which ear? In cases of deafness it is important to look into the family history. (Otosclerosis is considered to be a hereditary condition.)
13. Abscesses in ear—Has there ever been an abscess in either ear?
14. Perforation—Is the ear-drum perforated? Was it a spontaneous perforation, or was it opened by a physician?
15. Ear discharge—How long did it last? Was the ear treated?

The Nose

The subject should be seated so that the illumination used for reflection will be at either side desired, about 12 inches behind and to the side of the head. The head mirror described at the beginning of the section on the Mouth should be used in the examination of the nose.

Note any external abnormalities that may exist, such as injury to the bridge, congenital deformities, rhinophyma, eczema, etc. (In considering the degree of abnormality in nasal conditions, the function of the respiratory portion must be kept in mind: to filter, moisten, and warm the air.)

Now insert the nasal speculum and inspect the following parts:

1. *Septum.*—If abnormal, is there deflection, and of what type? If perforated, is the perforation of operative origin?

2. *Middle Meatus.*—Observe the middle meatus for anatomical differences or evidence of disease, either of nasal structures or contiguous sinuses. Note the size and character of the middle turbinate bodies. If they are abnormal, they may be considered as atrophic, hypertrophic, or hyperplastic.

Scrutinize the hiatus semilunaris for pus.

Note any polypi which may be present or any polypoid degeneration of the natural structures.

Fig. 11.—In introducing the nasal speculum in the right nostril the examiner directs the point of it toward the right eye (using similar technic on the left side) in order to avoid the sensitive nasal septum. He steadies the head of the subject while introducing the speculum.

3. *Inferior Meatus; Floor of Nose.*—Observe the size and character of the inferior turbinate bodies. These also, if abnormal, may be considered as atrophic, hypertrophic, or hyperplastic. Note the presence of foreign bodies, tumors, or rhinoliths.

4. *Nasopharynx.*—The nasopharynx can sometimes be observed through the nares; but more frequently the examiner must rely upon rhinoscopic examination for information. The

rhinoscopic mirror, previously warmed, should be placed just underneath the soft palate and the subject required to breathe through the nose. In this way the nasopharynx can be illuminated and made visible by the reflected light of the head mirror. Note hypertrophy of adenoid tissue; obstruction or malformation at orifice of eustachian tubes; exudence of pus; character of the posterior extremities of the turbinates. If one has the instrument at hand, the best method, of course, is by use of the pharyngoscope. This little instrument is somewhat similar in construction to the cystoscope. It is equipped with lenses and is electrically lighted. It is passed through the mouth back into the region of the pharynx.

The Throat

Examination of the throat should include inspection of the oropharynx, the tonsils, and the laryngeal structures.

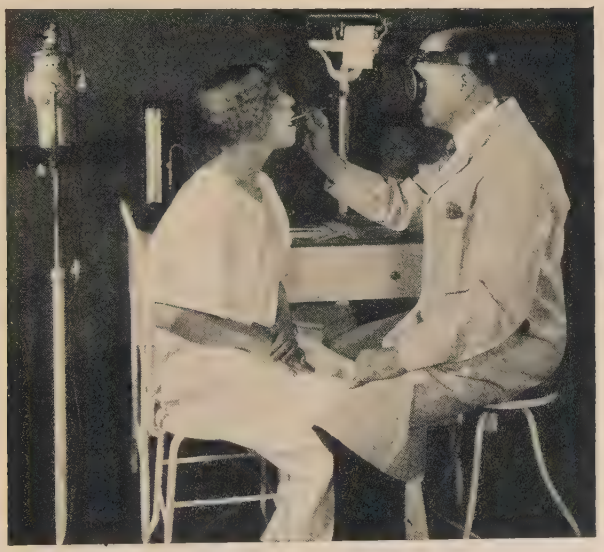

Fig. 12.—Exposing the oropharynx by placing the depressor well back on the tongue and making gentle but firm pressure downward, taking care to avoid causing the subject to gag.

1. *Oropharynx.*—The oropharynx can be inspected by direct vision. A hypertrophic condition of the lymph-follicles may

be found, or there may be diminished secretion, and the posterior pharyngeal wall may be covered with crusts. (This latter condition is usually accompanied by atrophic rhinitis.)

2. *Tonsils.*—The technic of the examination of tonsils is important. Inspection may reveal simply the size, exudative process, and, sometimes, chronic septic condition if the tonsils are frankly diseased. But to actually prove the presence of chronic disease in a majority of cases special manipulation is necessary.

Using a depressor to hold the tongue down in the median line, well forward, the examiner passes another depressor outward on the surface of the anterior pillar, at the same time pressing the pillar backward to expose the underlying tonsil. If now deep pressure is exerted at the junction of the upper and middle third of the tonsil, the subject at the same time phonating the syllable "ah," septic material, if present, will usually exude.

The septic material so expressed may consist of a thin pus or of caseous masses which may indicate necessity for removing the tonsils and should be noted. If doubt exists as to the character of the exudation, the tonsil culture should be utilized. Ordinarily material is taken from the crypts of the tonsils with a sterile platinum loop and applied to the culture-medium.

Record operative measures previously performed.

3. *Laryngeal Structures.*—These are inspected with a laryngoscopic mirror. The tongue should be pulled well forward, and the mirror, previously warmed, should be passed quickly back to the uvula, the subject at the same time breathing in a panting manner.

Note the condition and the size of the lingual tonsil at the base of the tongue and the condition of the epiglottis and laryngeal structures.

Special conditions to be observed in the laryngeal examination are:

Paralysis of one or more laryngeal muscles; size and location of foreign growths; condition of true vocal cords and arytenoid bodies. (These can usually be exposed to view by the subject's phonating the sustained vowel "E-e-e" at a high pitch.)

Papillomata, either suspended by pedicle or intimately attached to the vocal cords, are not infrequently seen, but may produce no other symptoms than chronic hoarseness.

When there are infiltrated masses involving the epiglottis or arytenoid with their contiguous structures, luetic, tubercular,

Fig. 13.—Examining the laryngeal structures. Note how the tongue is covered by gauze and held by the left hand while the right hand holds the mirror.

and cancerous lesions are always to be considered and made a subject of special investigation.

Record any acute processes noted.

Nasal Accessory Sinuses

Frontal and Maxillary Sinuses.—Transillumination is a routine requirement in examination of the frontal and maxillary sinuses and is conducted as follows:

(This examination to be entirely satisfactory must be conducted in a room from which all light has been excluded. The light for the test should be supplied by the Cameron or other suitable lamp designed for the purpose.)

In order to transilluminate the *frontal* sinuses, press the light just beneath the supra-orbital ridge and near the inner angle of the eye. This is done on both sides and any difference in density noted. It should be remembered that a frontal sinus may be absent on one side. Hence no definite information should be given until this possibility has been ruled out by *x*-ray examination.

In transilluminating the *maxillary* sinuses the lamp is placed in the mouth and the subject asked to close the lips. The light then passes through the sinuses to the face. (If the subject wears dental plates these should, of course, have been removed.) Any difference in density should be noted, as in examination of the frontal sinuses. If one prefers, the lamp may be pressed against the face in the infra-orbital region. The light then passes backward through the maxillary sinuses into the roof of the mouth and can be seen when the subject holds the head backward and opens the mouth.

In examining the accessory sinuses the light should be cut off for at least one minute before beginning the examination, the object being to permit the retina of the examiner to become hypersensitive to light so that even though the difference in density is very slight, it can be detected. If doubt arises in transilluminating either group of sinuses, it must be remembered that the *x*-ray is the best diagnostic aid and should be utilized freely under such circumstances.

Ethmoid Sinus.—Ethmoiditis or sinusitis may be evidenced by an accumulation of pus in the middle meatus or, if of long standing, by polypoid formation. (The *x*-ray must be utilized where ethmoiditis is suspected.)

Sphenoid Sinus.—Sphenoidal sinusitis may sometimes be diagnosed by observing pus exuding from the ostium and posterior wall of the nasopharynx. More frequently the *x*-ray must be relied upon.

Hay-fever

Hay-fever is an affection of the upper respiratory passages often associated with asthma and due to hypersensitivity of the individual to an offending protein.[1]

[1] For further discussion of protein sensitization, see Section 7, p. 111.

Pollenosis, or true hay-fever, is caused by the pollen of the various grasses, trees, weeds, or flowers. There are two groups generally recognized in temperate climates: first, the "rose cold" or spring type occurring in May and June; and second, the autumnal type appearing about the middle of August and extending up to the first frost. The former type can usually be traced to grasses, namely, timothy, red top, June grass, and orchard grass; the latter type being due to ragweed, golden-rod, sunflower, dahlia, etc. A very early type of pollenosis appearing about the middle of April can be traced to tree pollens.

Epidermal structures are also capable of producing symptoms resembling hay-fever, clinical signs developing whenever the sufferer is in immediate contact with the animal to which he is sensitive.

With almost mathematical precision the patient can foretell the time of the onset of the trouble. First, he notes congestion of the head, drowsiness, and a feeling of depression, which condition is followed shortly by itching of the eyes (a very important diagnostic symptom in hay-fever), sneezing, and vasomotor rhinitis. The conjunctiva is congested and lacrimation is profuse. The nose, on examination, shows typical evidence of vasomotor changes in the mucous membrane. As the concentration of the pollen in the air becomes greater, the symptoms become worse, the sufferer usually experiencing additional discomforts from asthmatic paroxysms. Symptoms disappear with the cessation of pollination. The possibility of protein sensitization being related to focal infection must be remembered.

The Ear

1. *Auricle:* Inspect for malformations or disease. Manipulate it gently, and if there is any disease in the canal pain will usually be produced and be of value in diagnosing deep-seated infections and eliminating symptoms of referred pain.

2. *Mastoid area:* Inspect for disease, past and present.

3. *Orifice of the canal:* Select the largest speculum that will fit comfortably and focus the light in such a manner that all portions of the canal can be seen. Note any pathology of the canal walls or any foreign bodies in the canal.

4. *Membrana tympani:* The subject's head and the light should be so placed as to get the best possible view of the membrana tympani. Pulling upward and backward on the auricle straightens the canal to some extent and facilitates a clear view. Any departure from the normal color, luster, and thickness should be noted. Note also deposits, retraction, bulging, scars, etc.; size and position of perforations and any apparent pathology involving the ossicles. An electrical otoscope with a magnifying lens is often of value in a more minute

Fig. 14.—Examining the auditory canal and membrana tympani. The speculum is held in place with one hand while the head is steadied with the other.

examination of the membrana tympani and in detecting any adhesions.

5. *Eustachian tube:* The patency of the eustachian tube may be determined by Valsalva's or Politzer's method; or, if the operator is sufficiently skilled, it may be inflated directly by the use of metal catheters designed for the purpose. Due caution should, of course, be observed in applying such methods where there is a history of nasopharyngeal infection or inflammation.

6. *Hearing:* Test for both conduction and perception. The subject, seated or standing, with his back to the examiner, occludes one ear by pressing the tragus firmly against the meatus. The other ear should be turned toward the examiner for testing. The hearing should be tested at 10 feet when using the whispered voice, and at 20 feet when using the low conversational tone method. The numbers used should not be spoken in consecutive order. The whispered voice is produced by using the residual air after the examiner has forcibly emptied the chest. If the hearing is normal, the subject should be able to repeat each number after it is given by the examiner, and it should be recorded as 20/20 (or, if the distance is 10 feet, as 10/10). If the subject cannot hear the numbers at this distance, the examiner slowly approaches him, repeating the number until he is able to hear it. As soon as the number is heard, the hearing is recorded, using the distance (in feet) from the subject to the examiner as the numerator of the fraction recorded, *e. g.*, 5/20 (or 5/10), 7/20, etc. Some examiners find it more satisfactory to use such numbers as 6, 66 in testing the higher range of hearing, and such numbers as 4, 14 in testing the lower range. A more accurate method of testing the ear is by use of the Bárány noise apparatus in one ear while the other ear is being tested with a No. 2-A audiometer.

In testing the perception mechanism use tuning-forks ranging from 16 double vibrations per second upward for low tones and a graduated whistle from about 60,000 double vibrations per second downward for the high tones. If a whistle is not at hand some of the high-pitched forks can be used (but not with so great accuracy). Test the relative bone and air conduction with a C or C_1 fork (Rinne's test[1]). For comparison of the bone conduction of the subject with that of the examiner, Schwabach's test[2] is made. Make Weber's test[3] also.

[1] *Rinne's test:* A tuning-fork is held alternately before the ear and over the mastoid process; if the sound is heard better before the ear, the air conductivity is better than the bone conductivity, and vice versa.

[2] *Schwabach's test:* Measurement of the time during which a series of tuning-forks are heard by air conduction and by bone conduction.

[3] *Weber's test:* A vibrating tuning-fork is held against the vertex. The sound is heard best by the non-affected ear if deafness is due to disease of the auditory apparatus; by the affected ear if deafness is due to obstruction of the air passages.

Differentiate catarrhal from nerve deafness. In cases of middle-ear infections and catarrhal conditions of the membrana tympani or eustachian tubes, the nose and throat conditions should be investigated.

Supplementary Investigations

The additional special tests and diagnostic measures listed below are indicated:

x-Ray of mastoid area:

When chronic suppurative otitis is found. (This condition is often indicative of more or less involvement of the mastoid cells—chronic mastoiditis. Both right and left areas should be *x*-rayed for comparison.)

x-Ray of sinuses:

When physical findings suggest pathology.

When there is a history of sinusitis.

When there is a history of focal infection after the teeth and tonsils have been excluded as possible foci.

Blood Wassermann test:

In disturbances of the vestibular apparatus.

In all cases of deafness where the cause is not apparent.

If non-operative perforation of the nasal septum is present.

In "putrid catarrh."

In persistent ulceration, past or present.

In paralysis of vocal cords.

Functional tests:

When there are disturbances of the vestibular apparatus.

Microscopic examination and culture:

When there are purulent discharges from the middle ear.

Tonsil culture:

When tonsils present defective appearance.

When there is a history of repeated attacks of tonsillitis.

When there is a history of rheumatic affections or rheumatic fever.

When there are cardiorenal disturbances.

Protein sensitization test:

When there are symptoms or history of hay-fever.

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Section 5

THE EYE

Introduction by Charles A. Drake, M. D.

A general physical examination is incomplete which does not include an examination of the eyes. Such examination affords valuable aid not only in the diagnosis of the diseases of the central nervous system but also in the diagnosis of constitutional affections and diseases of other organs.

The behavior of the pupils is of very great value in the diagnosis of certain nervous diseases. The Argyll-Robertson pupil is the most characteristic sign of an impending or beginning tabes, and may for a considerable period of time be the only one.

Protrusion of the eyeball is one of the cardinal signs of Graves' disease, but Von Graefe's sign is an early and often for a considerable time the only sign of the disease.

In the eye we have conditions and opportunities particularly favorable for the observation of changes in the living tissues. The blood-vessels lie in full view, and every vascular lesion known to general pathology is here available for minute study under a magnification of about 15 diameters, *i. e.*, the magnification obtained by direct ophthalmoscopy. In general arteriosclerosis the retinal vessels take part, and the recognition of beginning arteriosclerosis of the retinal vessels is of most vital importance. Arteriosclerosis and an atheromatous condition of the retinal arteries, with or without retinal hemorrhages, is a warning of impending cerebral apoplexy. Retinal arteriosclerosis often results from syphilis, is frequent with renal affections, and also with diabetes. With nephritis, retinal hemorrhages are usually striated or flame-shaped, while with diabetes they appear in the form of small, round spots. The so-called "embolism of the central retinal artery" which occurs in the middle-aged is usually an endarteritis obliterans, while the true "embolism of the central

retinal artery," especially if it occurs in a young adult, indicates endocarditis.

The study of the optic disk may yield evidence as to the seat and character of general disease, or disease of structures outside the eye, but near to it, of the utmost importance in the making of a diagnosis. The causes of optic neuritis are manifold and may be either general or local. The commonest causes are syphilis and nephritis. Among the local causes are suppurative inflammation in the orbit, in the ear, or in the accessory sinuses, and abscesses in the brain. If due to general disease it is commonly bilateral, while that due to local causes is more apt to be confined to one side. Optic neuritis is frequently caused by brain disease, especially by tumor, meningitis, and abscess, when it usually takes the form of bilateral choked disk. The diagnostic significance of choked disk is extremely valuable. It indicates an increase of the intracranial pressure, and affords strong presumptive evidence of a tumor as the cause. Simple optic nerve atrophy is usually due to tabes dorsalis, in which disease it begins in the temporal side. It frequently is one of the first signs and is ordinarily associated with the Argyll-Robertson pupil. Both eyes are affected, but not always simultaneously, several years often intervening before the second eye is affected, and many years often elapsing before the essential features of tabes develop.

Impairment of the vision is of great value in the localization of intracranial affections. If both eyes are affected the presumption is warrantable that the cause lies at or behind the chiasm, unless the cause is a double retrobulbar neuritis. One-sided blindness, when not dependent on an ocular affection, must be referred to the optic nerve between the globe and the chiasm, *i. e.*, a retrobulbar neuritis. A central scotoma, which is characteristic of retrobulbar neuritis, does not indicate a central lesion; but bilateral symmetrical defects affecting corresponding portions of both visual fields do indicate a central lesion. A bitemporal hemianopsia indicates a lesion at the chiasm. A homonymous hemianopsia, right or left, means a lesion affecting the fibers of one optic tract between the chiasm and the cortex on the opposite side. The lesion may result from exudation attending a basilar meningitis, a syphilitic gumma or other neoplasm, or a hemorrhage. Cortical disorders are

always binocular and are attended with preserved pupillary reactions.

Headaches, when associated with other symptoms directly referable to the eyes, usually bring a person to the oculist, but it often happens that persistent headache occurs in those with apparently normal vision, having no symptoms which direct attention to the eye. That is, people are more apt to seek a general physical rather than a special examination by an oculist. These cases are usually relieved after the eyes have been carefully refracted and proper lenses fitted. In doubtful cases rest of the eyes with paralysis of the accommodation will solve the problem of affording relief. Migraine frequently follows overuse of the eyes. It is probably an expression of general nervous exhaustion, and proper glasses will often do much toward bringing relief. Many functional affections are undoubtedly dependent to a greater or lesser degree upon eye-strain. Epilepsy, chorea, neurasthenia, and hysteria have all been attributed to eye-strain. When we remember that during all our waking hours the eyes are in constant use in both distant and near vision, we are in a position to realize the amount of nervous energy which is called for, and to appreciate the strain resulting from an abnormality in the structure or function of the eyes. This strain may be well borne by persons in perfect health and cause no ocular symptoms. But when a person of neurotic temperament, hereditary or acquired, is subjected to any special source of nervous exhaustion, the effect of eye-strain is intensified and far reaching and may be a cause in the development and maintenance of a general functional neurosis. Glasses often bring the needed relief to the nervous system.

Examination of the Eye

In the examination of the eye consideration should be given to the following matters:

1. History (family, past and present).
2. Vision, distant and near, with and without glasses.
3. Test for astigmatism.
4. Muscle balance (simple test for).
5. Fields for form and color.

6. External affections of the eye.
7. Media.
8. Fundus.
9. Intra-ocular tension.

History

Preliminary to the routine examination of the eye, the examiner should consider certain features of the subject's history:

1. Occupation—Does it require the subject to use his eyes for very minute, intensive work? Nature of working light.

2. Occurrence of headache—Does the subject have headaches? For how long has he had them? How frequently do they occur? Do they occur in the morning or afternoon? (The headache that begins or becomes more severe in the afternoon or evening is often associated with eye-strain. Train sickness, the sensation of dizziness and confusion in the midst of traffic or crowds, headaches caused by motoring or watching motion pictures, the so-called "bilious" headaches, and headaches accompanying nervous indigestion are frequently associated with eye-strain.)

3. Eye diseases in childhood (if any).

4. Trachoma.

5. Glasses—Does the subject wear glasses, or has he ever worn glasses? For how long? When were they last changed? (Hordeoli, lid margin irritation, and some of the mild forms of conjunctivitis are often the result of eye-strain and indicate the need for glasses.)

6. Presbyopic changes—The physician must watch for presbyopic eyes. Around the age of forty to forty-five it usually becomes necessary to provide a special correction for near vision.

Vision

Distant Vision.—If the subject wears glasses, check the vision first without glasses. Distant vision should be taken at a distance of 20 feet. Test each eye separately, covering first the left and then the right eye with a card. Both eyes should be open, however, for if the subject closes or presses the eye that is not being tested at the moment, the vision of this eye may be blurred when it is tested.

If the vision is normal, record it as 20/20; if not normal, record the smallest type read, using 20 as the numerator of the fraction. That is, if the third line from the top is read, the vision is recorded as 20/70, for this line is normally read at 70 feet. If the subjects reads more than half but not all of the letters in the line that should be read at 30 feet, the vision is recorded as 20/30−. Similarly, if one distinguishes all the letters in the line that should be read at 20 feet and, in addition, less than half the letters that should be read at 15 feet, then the distant vision is recorded as 20/20+.

If glasses are worn, check the vision with glasses on, noting whether they fully correct the error. At this point it is well to inquire as to when the glasses were last fitted and whether the examination was made by an oculist.

Astigmatism.—Test each eye for astigmatism—also at a distance of 20 feet—using the astigmatic chart. If gross errors of astigmatism are present, one group of lines will stand out more distinctly, indicating the meridian in which the astigmatic error is present. The examiner should note whether or not the glasses worn have round lenses in celluloid frames, as it should be remembered that such frames will sometimes allow the lenses to turn one way or another, and, in cases corrected for astigmatism, change the axis, thereby rendering the glasses totally unfit for use. When the lenses have moved in this way, they should be readjusted by an optician.

Near Vision.—Test each eye separately, the Jaeger test type being held 15 inches from the eye. If the vision is normal, the subject should be able to read the smallest type, and the vision is recorded as "J1" (Jaeger 1). If the vision is not normal, record the smallest type read as "J4," "J7," "J0 (none)," etc.

Muscle Balance

The screen and parallax is a simple muscle test. Ask the subject to fix his eyes on a point held about 20 inches from the eyes, and cover first one eye and then the other with a card. If any imbalance exists, the covered eye will not remain fixed and can be seen to swing back to the point of fixation when the card is moved to the other eye.

Look for strabismus, esophoria, and exophoria.

Note nystagmus when present.

Visual Fields

Form.—Fields for form are taken roughly by ascertaining if the subject can, with his eye fixed on the examiner's eye, see the moving hands of the examiner (which are 30 inches apart) as they are carried in a circle throughout the visual field. The visual field is normally contracted on the nasal side.

Color.—Test fields for color by flashing small disks—red, green, and white—in front of the eye. Pins with colored heads will serve the purpose very well.

External Affections of the Eye

Conjunctiva.—Examine the lid margins, noting the thickness of the lids and whether or not they are reddened or inflamed. Look for crusts along the base of the eyelashes. Evert the lids and examine the conjunctiva, particularly the bulbar conjunctiva, for acute or chronic inflammation, ciliary infections, marginal ulcers, and pannus (usually found in true trachoma).

Tear Sacs.—Press upward, over each tear sac, and note if pus exudes.

Pupils.—Look for irregularity, inequality, or immobility of the pupils. If the pupil is irregular, look for synechia, and if there is any alteration in size or shape of the pupils, inquire as to a history of injury. (Also inquire as to syphilis.) Pupils, pin-point in size suggest tabes or morphinism. Slightly dilated pupils suggest, among other things, alcoholism or neurasthenia.

With the subject gazing into space examine the pupillary reflexes for light by means of oblique illumination. The accommodation may be tested by having the subject fix his eyes on an object held a few inches in front of them, when the pupils will be seen to contract. They will again dilate when a distant object is viewed.

The Media

A dark room is preferable for examination of the media.

Cornea.—The cornea is first examined by oblique illumination, using a +16 lens as a condensing lens. Investigate for acute phlyctenular or acute or chronic interstitial keratitis, scars, pterygium, and pannus.

Study the deeper layers of the cornea with a loupe (about 10-power), searching for deposits on Descemet's membrane. The presence of these deposits always signifies some form of choroiditis, even though no change can be detected with the ophthalmoscope.

Vitreous; Lens.—Examine the vitreous and lens with a +6 lens in the ophthalmoscope. The ophthalmoscope should be about 6 inches from the subject's eye in observing the vitreous and slightly farther in observing the lens. Ask the subject to look up and down and from side to side several times. Search for vitreous opacities.

Now rotate a +20 lens in front of the ophthalmoscope and examine the lens more closely. In the early stages lens opacities are usually located in the nasal side and down, and can best be seen by looking down and in.

The Fundus

In examining the fundus it is more convenient for the examiner to use the ophthalmoscope before the right eye when examining the right eye of the subject, and before the left eye when examining the subject's left eye. The examiner should commence the examination by using the aperture and then rotating either a plus or minus lens, as may be required, until the region of the optic nerve is brought into good focus.

Nerve Head (Optic Disk).—With the subject gazing into space, approach the eye from the temporal side at an angle of 45 degrees, thereby bringing the nerve head directly into the field of vision.

Note the size, shape, and color of the disk; note whether the margins are clear and well defined. Compare with the disk in the other eye and note if there is any cupping or arterial pulsation. Do not mistake medullated nerve-fibers for a pathological condition involving the region of the optic nerve.

Macula.—This region lies about two papillæ breadths to the temporal side of the nerve head, and is the geometrical center of the retina, the fovea frequently being distinguished by a slightly pinker area. If the examiner finds it difficult to locate the macula, the subject is directed to look at the light in the ophthalmoscope. This will bring the macula directly

into view, but it has the disadvantage of causing the pupil to contract unless a cycloplegic has been used.

Periphery; Vessels.—In examining the periphery it is important that every visible part of the retina be covered. This is accomplished in a systematic, routine way by requiring the subject to look up, up and to right, up and to left, to left, to right, down, down and to right, down and to left, and, finally, straight ahead—thereby covering the entire retinal field. This

Fig. 15.—In direct ophthalmoscopy the examiner should use the ophthalmoscope before his right eye while examining the right eye and before his left eye while examining the left eye of the subject. Any visual defect of the examiner should be allowed for or, better still, corrected.

is considered preferable to having the subject fix the eye on a distant object while the examiner with the ophthalmoscope attempts to move before the eye so as to bring the different parts of the retina into view.

The impairments to be sought are: hemorrhages, scars, evidence of inflammation, separation of or injury to the retina, choroiditis, colobomata, exudates, pigment deposits, tumors or elevations, differences in color, and the tortuosity, color, size, and pulsation of the vessels.

It is essential that the examiner familiarize himself with the various types of normal fundi, such as the tessellated, negroid, albinoid, etc. These will be found in any illustrated standard text-book or atlas on the fundus. (It should be remembered that in amblyopia exanopsia the fundus will reveal nothing abnormal on ophthalmoscopic examination.)

Intra-ocular Tension

With the eyes directed downward and the lids closed, the examiner palpates the eyeball firmly with the two index-fingers.

The examiner should suspect glaucoma in the presence of any of the following signs or symptoms: Pathological cupping of the optic disk; increased tension; when there are halos around lights; blurring of the vision accompanied by pain in the eyes; a shallow anterior chamber; a family history; or where the subject is repeatedly having his glasses changed without obtaining relief. To overlook this condition is a serious mistake.

Supplementary Investigations

The additional special tests and diagnostic measures listed below are indicated:

Irregularity, inequality, or *immobility of the pupils:*
Blood Wassermann test.

Iritis or *history* of *iritis:*
Blood Wassermann test.
x-Ray of teeth.
x-Ray of sinuses.
Examination of tonsils—tonsil culture.

Changes in the choroid:
Blood Wassermann test.
x-Ray of teeth.
x-Ray of sinuses.
Examination of the tonsils—tonsil culture.

Optic atrophy:
Blood Wassermann test.

Retrobulbar neuritis:
Blood Wassermann test.
x-Ray of teeth.

x-Ray of sinuses.
x-Ray of sella turcica.

Albuminuric retinitis and *arteriosclerosis:*
Blood Wassermann test.
Blood chemistry determination.
Renal function test.
Twenty-four-hour urine concentration test.

Suspected diabetic retinitis:
Blood-sugar determination.
Qualitative and quantitative urinalysis.

Interstitial keratitis:
Blood Wassermann test.

Acute and *chronic purulent discharges:*
Microscopic examination of exudate (stained).
Culture of exudate.

Hemianopsia, ptosis, and *where diplopia has occurred suddenly:*
Blood Wassermann test.
x-Ray of sella turcica.

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Section 6

THE CIRCULATORY SYSTEM

Introduction by S. Calvin Smith, M. D.

In the assessment of physical fitness of supposedly healthy individuals seeking a periodic health survey the condition of the circulatory apparatus should never be taken for granted simply because of the absence of history or symptoms. This region so frequently reflects the influence of infection, of nervous strain, or of toxic factors that even in apparently robust and vigorous people the full routine should be followed in order to test the cardiac reserve and the circulatory efficiency. There must be a thorough search for latent defects apart from the response of the circulatory system to these tests. It is highly important to search the whole body for conditions that might conceivably, in the long run, damage the heart or blood-vessels.

The problem that confronts the physician in this type of examination is that of bringing out all possible information upon which counsel or direction may be based for maintaining the circulatory system at a high level of efficiency and protecting it from future damage. Hence, the importance of mastering the technic of analyzing the circulation as set forth in this manual, not only by the routine methods of physical diagnosis, but by the auxiliary *x*-ray and laboratory investigations that might be recommended under certain conditions.

Following we have grouped a few of the more important points which may prove of practical value in conducting a physical appraisal of a heart:

1. Heart defects are rarely primary; they are usually sequelæ of or secondary to abnormal conditions elsewhere in the body.

2. A history of recurrent tonsillitis, rheumatic fever, scarlet fever, chorea, or diphtheria, *however remote*, requires that the examiner be unusually alert in searching for evidence of heart impairment.

3. Defective valve sounds are rarely found in affected hearts during the early stages of impaired heart efficiency.

4. The muscle is of more importance than the murmur; the rhythm is of more importance than the rate.

5. Some murmurs are entirely compatible with health; some arhythmias are physiological in certain hearts.

6. Murmurs, when of pathological significance, indicate *endo*cardial involvement; arhythmias, when of pathological significance, indicate *myo*cardial involvement.

7. Cardiac reserve force can be so depleted that the attendant heart muscle exhaustion and consequent heart *protest* will simulate actual heart disease.

8. The greatest advance in modern cardiology is the recognition of the part played by focal infections in heart impairment.

9. A heart appraisal cannot be said to be complete without *x*-ray studies of the teeth, supplemented by clinical dental examination.

10. Heart balance can be disturbed by such imponderable factors as fatigue, gastro-intestinal disturbances, endocrine imbalance, and also by a person's being out of harmony with his environment or his life.

Examination of the Circulatory System

Examination of the circulatory system should include the following:

1. History.
2. Examination of the heart and aorta:
   - Inspection.
   - Palpation.
   - Percussion.
   - Auscultation.
   - *x*-Ray examination.
   - Electrocardiographic examination.
3. Examination of the peripheral vessels:
   - Size.
   - Thickness of vessel walls.
   - Pulse.
   - Circulation of extremities.

4. Cardiac reserve:
   Blood-pressure (before and after exercise).
   Pulse rate (before and after exercise).

History

Question the examinee with regard to any diseases he may have had which might have involved the heart, such as tonsillitis, rheumatic fever, nephritis, syphilis, gonorrhea, chorea, scarlet fever, diphtheria, measles, smallpox, tuberculosis, typhoid fever, chronic focal infections, etc. If he is aware of any heart disease at the present time, or if he has had any attack in the past, inquire as to the date of onset, the symptoms, duration, and the treatment.

The Heart and Aorta

Inspection.—Have a convenient flow of light over the chest. Look for apex-beat, precordial heave, areas of localized pulsation, etc.

Examine the suprasternal notch and the supraclavicular fossæ for abnormal arterial and venous pulsations. Distinguish between pulsations due to the overactive, irritable heart and those due to aneurysm of the aortic arch. Where marked enlargement of the heart is suspected because of abnormal tugging in the eleventh or twelfth left intercostal space well around toward the posterior axillary line (Broadbent's sign), pericardial adhesions as a cause must be ruled out before a final opinion is reached.

Examine the condition and color of the skin and mucous membranes, especially for pallor and cyanosis.

Look for clubbing of the fingers and the presence of inequality of the pupils.

Palpation.—The examiner should place his hand firmly over the precordial area, first at the apex and then at the base.

Now palpate lightly for the presence of thrills, preferably with the tips of the fingers.

Palpate the suprasternal notch for pulsation and thrills.

Now determine the presence or absence of tracheal tug. This is done with the subject in the erect position. He is asked

to extend the head while the examiner makes gentle pressure upward with the thumb and index-finger on the thyroid cartilage, thereby putting the trachea on the stretch. If tugging is present it will be transmitted to the fingers of the examiner.

When a diseased heart is found, no examination is to be considered complete until information concerning the condition of the lungs, size and pulsation of the liver and the spleen, the presence or absence of ascites and of edema is obtained.

Percussion.—Map out the right border of the heart by percussion, the finger resting in the fourth intercostal space rather than over the ribs.

Map out the left border (fifth intercostal space) and express measurement in inches from the midsternal line. (Measurement of the left border where there is marked curvature of the chest is made by erecting a perpendicular line from the left border and measuring from the midsternal line. To measure around the chest from the midline in such instances is inaccurate.)

Auscultation.—With a stethoscope listen for the character of the heart sounds and the possible presence of murmurs. Listen over:

1. Apex (mitral area).
2. Lower end of sternum, at junction of left fifth rib (tricuspid area).
3. Second left interspace (pulmonary area).
4. Second right interspace (aortic area).
5. Suprasternal notch.

The important features in connection with the character of the heart sounds are:

1. Intensity (allow for chest wall—average, thin, muscular, or fat).
2. Duration of first sound (helpful in determining a large or small muscular element).
3. Quality and pitch.
4. Occurrence (whether heart sounds are equal and occur at the same time or are reduplicated).

A murmur, especially an organic one, may alter or entirely replace the normal heart sounds. In differentiating murmurs the following features are to be considered:

1. Time of occurrence with reference to cardiac cycle—presystolic, systolic, diastolic—can be determined by feeling the carotid pulse while listening over the heart.

2. Point of maximal intensity.

3. Quality of abnormal sounds—faint, soft, loud, harsh, diminuendo, crescendo.

4. Associated findings, such as:

Arterial or venous pulsation.
Character of arterial pulse.
Size and shape of area of cardiac dulness.
Presence of cyanosis or edema.
Age of individual.
History of diseases during which the heart may have become affected.

Systolic murmurs at the apex fall into two groups—*functional* and *organic*. The term "functional murmur" is applied to a variety (almost universally systolic) of sounds which are not indicative of a structural lesion. A valve may leak because of lack of tone of the surrounding ring. Cardiac displacement and exophthalmic goiter are often associated with systolic murmurs. Such murmurs are called hemic, accidental, and cardiorespiratory. In functional murmurs the heart is not enlarged and there is not likely to be any history of recent or past infections in which the heart is commonly affected. Systolic murmurs over the pulmonary area are very common and usually have no significance. It is to be remembered, however, that systolic murmurs transmitted from the aortic area, and of an organic origin, can also be heard over this area.

"Organic murmurs" are associated with defects in one or more of the heart valves. They are ordinarily accompanied by an enlarged heart, occasionally by an accentuated second sound; but a murmur should be regarded as suspicious in the absence of enlargement when there is a history of recent or remote illness of the type in which the heart is commonly involved.

x-Ray Examination.—The *x*-ray furnishes the most accurate means at our disposal for determining the size, shape, and position of the heart. It should be utilized in every case in which this information is important.

There are two methods of examining the heart and aorta by *x*-ray: (1) *radiographic* and (2) *fluoroscopic.* From the fluoroscopic method the location of pulsations can be accurately determined and the heart can be seen in motion. It is customary to take the radiograms of the heart with the tube at a distance of 6 or 7 feet from the plate, the latter being as near the chest as possible with the rays directed toward the subject's back. At this distance the rays are almost parallel and the distortion and enlargement of the heart shadow are minimized.

Electrocardiographic Examination.—The electrocardiogram is a graphic registration of the change of potential in the heart, and should be employed in every case of heart irregularity if one is definitely to determine the type of irregularity present. It should be used in every case where the heart rate is persistently below 50 or above 120 beats per minute. It should be used in every case where the history points to myocardial or coronary disease. The electrocardiogram is of more value in proving the presence of true dextrocardia than the *x*-ray. It is a valuable measure of precaution in any case where the integrity of the cardiac mechanism is in doubt.

The Peripheral Vessels

Palpation should be made as follows:

1. *Radial vessel, right and left:* To determine the character of the vessel walls obliterate the pulse by compressing the artery with the index- and ring fingers while the vessel is rolled beneath the finger-nail of the middle finger.

2. *Brachial vessels:* In a similar manner palpate against the humerus.

3. *Posterior tibial vessels.*

4. *Dorsal artery of foot:* When there is a history of numbness, tingling, or intermittent claudication.

5. *Femoral vessels:* When edema of the leg exists which is not explained by other causes.

6. *Temporal vessels:* These are normally tortuous and are more easily palpated. Record of the condition of the vessels of the eye-grounds is most important in relation to cerebral arteriosclerosis and is considered in Section 5.

Fig. 16.—Palpating the radial artery to determine the presence and degree of sclerosis. This is done by obstructing the circulation above and below the ring and index-fingers respectively, while the middle finger presses the radial well down against the bone. In this position the artery is rolled beneath the finger-nail when the degree of thickening is readily determined.

Fig. 17.—It is important to examine the radial pulse on both sides for the purpose of comparison.

7. *Superficial veins:* Where superficial veins can be palpated, examination should be made for the presence of phlebosclerosis. (This is not as important as arterial changes, yet it has an important influence on the subject's condition in case of chronic toxemias.)

The presence of varicose veins on the abdomen and chest as well as on the extremities should be recorded. Varicosities on the abdomen point to obstruction of the return circulation within the abdomen. Hard nodular veins of the extremities indicate previous thrombosis. Tenderness along the course of a vein may be evidence of an acute phlebitis. Where phlebitis exists an attempt should be made to elicit the cause, such as typhoid fever, puerperal sepsis, etc. Edema of the legs not accounted for by local causes, such as varicose veins, phlebitis, etc., should prompt an investigation of the abdomen, particularly of the pelvic region, for obstruction, such as pressure caused by enlarged glands, fibroid tumors, malignant growths, etc.

Taking the Blood-pressure.—Blood-pressure (both systolic and diastolic) is best taken by the auscultatory method with a mercurial instrument. Seat the subject with forearm, preferably the left, supinated and resting on the table, and fasten the arm band above the elbow. Place the stethoscope over the brachial artery at the fold of the elbow, avoiding undue pressure, and inflate the sphygmomanometer bag until the sounds of the pulsating artery disappear. Slowly release the air until the sounds return.

The sounds elicited over the artery may then be distinguished as follows:

First is heard a sound sharp and snappy. The systolic pressure is read at this point.

Succeeding the snappy sound one distinguishes a soft, delicate murmur. No reading is taken at this point.

Succeeding the murmur is a return of the snappy sound, which is also disregarded in the reading.

The snappy character continues for a varying number of beats and then becomes abruptly muffled. The diastolic pressure is read at this point.

The muffled sound finally disappears. Some have been accustomed to reading the diastolic pressure at this point,

but the consensus of opinion among leading cardiologists fixes the diastolic pressure at the point where the sound becomes abruptly muffled.[1]

Where premature contractions exist, causing isolated elevations of pressure, the average should be taken and expressed as the blood-pressure for that particular individual, or both the high and low systolic pressures should be noted.

In certain cases it is desirable to take pressure readings in the right arm as well, where there is difference in pulse tension on the two sides or when aneurysm is suspected.

The following table shows the systolic and diastolic pressures for men and women between the ages of twenty and sixty[2]:

	SYSTOLIC		DIASTOLIC		PULSE-PRESSURE	
Age.	*Women* (mm.).	*Men* (mm.).	*Women* (mm.).	*Men* (mm.).	*Women* (mm.).	*Men* (mm.).
20.....	116	120	77	79	39	41
30.....	119	122	79	81	40	41
40.....	124	125	82	83	42	42
50.....	130	129	85	85	45	44
60.....	134	134	87	87	47	47
All ages.....	121	124	80	81	41	43

Variations due to build are slight, ranging from $2\frac{1}{2}$ to 5 mm., the high values being found in the extreme overweight group. The same applies to height. The average systolic pressure for all ages at 5 feet is 120; at 6 feet, 3 inches, 124.

Pulse-pressure is the difference between systolic and diastolic, and ranges normally from 30 to 55 mm. Blood-pressure of women is distinctly lower than that of men at the earlier ages. There are only slight differences at later ages. In health the blood-pressure may vary temporarily 15 mm. above or below the average. Wide variations sometimes occur from slight nervous troubles.

Some authorities lay great stress on the importance of testing for so-called blood ptosis. This is indicated when the systolic pressure with the subject standing falls below the systolic pressure when the subject is recumbent.

[1] Report of Blood-pressure Committee, by H. W. Cook, M. D., Proceedings of Life Insurance Medical Directors of America, vol. 8, 1921–22, p. 38.

[2] See Appendix, p. 350, for discussion of significance of variations in blood-pressure.

Hypertension.—Pressures persistently above the average should always be carefully studied and followed up. A persistent slight elevation in blood-pressure, or so-called "high" blood-pressure, which is moderately above normal, should warrant careful investigation of kidney function, serological examination, and *x*-ray of the heart. High blood-pressure which has been maintained over any length of time is usually found associated with slight hypertrophy of the left side of the heart. It may also be accompanied by a systolic murmur over the aortic area or by evidence of valvular insufficiency. The majority of high blood-pressure cases show little or no evidence of kidney damage and fall into a group separate from those associated with actual kidney disease.

In the case of hypertension it is important not only to carefully search the habits in regard to the use of tea, coffee, tobacco, and alcohol, but it is imperative to investigate sources of focal infection. Such investigation would include, among other things, *x*-ray of the teeth, tonsils, and intestinal tract. Overweight, as shown by comprehensive statistics,[1] is an outstanding factor in high blood-pressure. It should be kept in mind that high blood-pressure is not an evidence of arteriosclerosis, but that it is frequently coexistent with marked arterial change. Most arteriosclerotics, uncomplicated, run a low blood-pressure.

Hypotension.—A pressure persistently 15 mm. below the average for the age falls in the class of hypotension. Underweight, neurasthenia, and tuberculosis are outstanding factors in this group. Where a hypotension exists, Addison's disease should also be kept in mind. Pigmentation should be looked for on the skin and mucous membrane, and a careful gastro-intestinal history should be elicited. Occasionally focal infection or some error in living habits is a factor. Hypotension is frequently found in association with arteriosclerosis.

Diseases of the Heart

Following is an outline of the most commonly found diseases of the heart:

[1] The Relationship of High Blood-pressure to Other Impairments, by Eugene Lyman Fisk, American Medicine, June, 1923, pp. 446–454.

1. Organic valvular defects:
   - Mitral insufficiency; mitral stenosis.
   - Aortic insufficiency; aortic stenosis.
   - Tricuspid insufficiency; tricuspid stenosis.

   Congenital defects:
   - Pulmonary insufficiency.
   - Pulmonary stenosis.
   - Patent ductus arteriosus.
   - Patent foramen ovale.
   - Patent interventricular septum.

   Myocardial changes.
   Pericarditis.
   Cardiac dyspnea (*so-called cardiac asthma*).
   Displaced heart.
   Disorders of the heart beat:
   - Sinus arhythmia.
   - Premature contractions.
   - Auricular fibrillation.
   - Paroxysmal tachycardia.
   - Auricular flutter.
   - Heart-block.
   - Pulsus alternans.

   Angina pectoris.
2. Diseases of the aorta:
   - Aneurysm.
   - Aortitis.
3. Diseases of the peripheral vessels:
   - Endarteritis.
   - Arteriosclerosis.

Organic Valvular Defects

Mitral Insufficiency.—This is the simplest type of heart-valve involvement and carries little or no discomfort as long as the heart muscle is in a good functional state. It is usually associated with hypertrophy of the heart, unless it arises in the course of an acute infectious disease such as rheumatism, tonsillitis, chorea, scarlet fever, etc. It is identified by the presence of a systolic murmur with the maximal point of intensity at the apex, often with accentuation of the second sound. Of the infections causing mitral insufficiency, the most com-

mon ones are: rheumatism, chorea, and tonsillitis (rarely scarlet fever). This condition is frequently associated with mitral stenosis.

Mitral Stenosis.—This is identified by two varieties of sounds occupying different phases of the cardiac cycle: (1) *presystolic murmur* and (2) *diastolic murmur.*

The presystolic murmur is usually best elicited after exercise or in the prone position. It is well localized at the apex. It has a rumbling, rough, or vibratory character, either of short or of long duration, rising in crescendo and ending in a sharp first sound. It is often accompanied by a thrill which, when irregularity of the heart occurs, may disappear. The murmur usually disappears with the onset of fibrillation, although in rare instances it may persist. It is accompanied by an accentuated pulmonary second sound and also by evidence of enlargement of the heart to the right. Left-sided hypertrophy is not necessarily found unless the condition be complicated by an insufficiency. Some of the smallest hearts with valve lesions are met with in cases of mitral stenosis.

The diastolic murmur may appear either with or without the presystolic, and usually accompanies the first part of the diastole. It is diminuendo in character, at times merging into the presystolic. At times it may be the only audible murmur at the apex. Another diastolic murmur appearing in mitral stenosis and deserving consideration is the so-called "Graham Steele murmur" of pulmonary incompetency, heard along the left border of the sternum and resembling the diastolic of an aortic insufficiency.

Aortic Insufficiency.—The evidence here is the presence of a diastolic murmur heard loudest at the second right interspace, or over the third left interspace; often also at the apex. It is frequently associated with downward enlargement of the heart, collapsing pulse, pistol-shot sound in the femorals, capillary pulse, and high pulse-pressure.

It is to be remembered that a large percentage of diastolic murmurs of aortic insufficiencies may not be heard over the base. It is not uncommon to have to use the ear or a Bowles stethoscope in order to elicit such a murmur.

Aortic Stenosis.—This is evidenced by a rough, vibratory, systolic murmur, associated with the diastolic murmur of

aortic insufficiency, heard loudest at the second right interspace and transmitted to the suprasternal notch and vessels of the neck. It is accompanied by a systolic thrill (without which no diagnosis of stenosis should be made). There is frequently cyanosis and occasionally clubbing of the fingers.

Other systolic murmurs with evidence of an aortic insufficiency represent dilatation of the sinus of Valsalva. Functional systolic murmurs also encountered in the aortic area are not associated with any sign of valvular disease.

Tricuspid Insufficiency.—This is seldom recognized as a primary valvular disease. It is usually seen complicating a mitral lesion and is determined (1) by the presence of a systolic murmur over the lower end of the sternum, (2) by the presence of pulsation in the veins of the neck, enlargement and tenderness of the liver, and (3) sometimes by pulsation of the liver, and by ascites and edema of the legs.

Tricuspid stenosis simulates mitral stenosis and is rarely diagnosed during life.

Congenital Defects

Congenital murmurs are mostly systolic. The situation of the maximal intensity does not correspond with those of the ordinary organic murmurs. They are often associated with humming bruits at the base and with an abnormal cardiac contour. Cyanosis and clubbing of the fingers are also associated signs of congenital valvular defects.

Pulmonary insufficiency is rarely an acquired disease except in certain deformities of the chest and complicating stenosis (Graham Steele murmur). It is usually a congenital disease unless found as a part of a general carditis. Its presence is indicated by a diastolic murmur heard loudest over the pulmonary area with cyanosis and clubbing of the fingers, and also by radiographic changes in the heart silhouette in the region of the pulmonary artery.

Pulmonary Stenosis.—This congenital defect is much more common than pulmonary insufficiency. The murmur is harsh, systolic in time, usually accompanied by a thrill at the base, and is transmitted toward the left. Cyanosis is marked and polycythemia is not uncommonly present.

The other congenital murmurs, rarely noted, are those due to a *patent ductus arteriosus, patent foramen ovale,* and *patent interventricular septum.*

Myocardial Changes

Muscular changes are the most difficult heart conditions to identify, since their manifestations are so variable. Any of the diseases producing involvement of the endocardium can produce changes in the myocardium. It is doubtful if the heart muscle ever escapes when the heart valves are attacked. Muscular changes may be temporary or permanent and are caused by infections and toxins. Such changes may exist without showing any evidence of valvular defects. Myocarditis is most frequently caused by acute rheumatic fever, tonsillitis, chorea, diphtheria, typhoid, and pneumonia. It may be found associated with evidence of valvular change and is to be suspected in individuals who show no signs of valvular disease, but who give a history of cardiac decompensation (dyspnea, edema of the legs, precordial, substernal, left shoulder and arm pain) or individuals whose hearts make limited response to effort.

Auricular fibrillation is interpreted as giving evidence of myocardial degeneration. Extrasystoles in themselves do not indicate myocardial disease, but merely focal irritability.

A persistent rapid pulse should raise a suspicion of myocardial change and prompt investigation of the heart by electrocardiographic tracings, blood tests, and a search for focal infection.

The findings which are of significance from a myocardial standpoint are, briefly, muffled heart sounds—either with or without a systolic murmur—a gallop rhythm, and heart enlargement.

In the absence of definite pathology there is a fairly wide range in the quality of heart muscle as shown by functional tests.

Pericarditis

Pericarditis may be either acute or chronic. The chronic varieties are usually due to syphilis or tuberculosis. The acute varieties may complicate many of the acute infectious diseases.

It is also to be remembered that pericarditis is a frequent terminal complication of chronic kidney disease.

An enlarged heart, not accounted for by valvular defects or myocardial disease and without the characteristic rub of pericardial friction should raise the suspicion of an effusion into the pericardial sac. The presence of signs of a left pleural effusion should also suggest this possibility. The presence of a "pulsus paradoxus," indicated by cessation of pulse-beat during inspiration and reappearance during expiration, points to either the existence of fluid in the pericardial sac or an adherent pericardium.

Cardiac Dyspnea (So-called Cardiac Asthma)

A history of asthma makes exclusion of the cardiorenal system as a cause imperative. The presence of a high blood-pressure with asthma should make the examiner doubly suspicious, and warrants laboratory investigation to establish or exclude cardiorenal disease as a possible factor.

Displaced Heart

This may be a true dextrocardia, with complete transposition of the viscera; or it may be a false dextrocardia due to pushing over of the heart to the right by fluid or air in the left chest or by tumor. Occasionally it is due to a pull of adhesions from the right side. A heart may be displaced to the left by the same causes in the right chest, and in this instance elicits signs which might suggest enlargement of the heart to the left. A heart apparently enlarged to the right or left, with the presence of signs of fluid in the left chest raises the question of the existence of pericardial effusion and prompts the use of the *x*-ray as a final means of clearing up the diagnosis.

Disorders of the Heart Beat

Arhythmias are usually discovered at some time during the course of the examination or elicited in the history. In all types of cardiac irregularity a thorough investigation should be made for focal infection and investigation of the habits of the individual in regard to tea, coffee, tobacco, and alcohol, as well as the state of the bowel elimination.

Sinus Arhythmia.—A respiratory condition characterized by accelerated pulse-rate during inspiration and a diminished rate during expiration. It is the commonest irregularity of early life and a common cause of fainting attacks in young people. An electrocardiogram of this condition discloses its characteristic features. It is of clinical importance only because it may be mistaken for some serious form of irregularity.

Premature Contractions.—Expressions of premature contraction of the heart muscle, arising in the auricle, ventricle, or the junctional tissues. This condition is common in the middle period of life and may give rise to annoying symptoms, but carries little significance as far as the condition of the heart muscle is concerned. Very occasionally it may be mistaken for a more serious heart irregularity, and in this instance and in others where question arises electrocardiograms or pulse tracings are important. It is identified by the character of the heart sounds during the period of premature contraction and also by a compensatory pause which usually follows. This type of irregularity disappears during exercise and reappears thereafter. Careful survey of the personal history for the excessive use of tea, coffee, tobacco, or alcohol is important, as well as a careful survey of the body for focal infection. The origin of the various premature beats can only be determined by an electrocardiogram.

Auricular Fibrillation.—This is one of the most serious of the heart irregularities indicating muscle disease. It produces a perpetual irregularity of the heart which is frequently associated with a marked pulse deficit, that is, a difference between the beats heard at the apex of the heart and those counted at the radial vessel. A point to be re-emphasized is that when auricular fibrillation occurs in cases of mitral stenosis the presystolic murmur usually entirely disappears and is replaced by a diastolic murmur. Aside from the perpetual irregularity the condition is also identified by typical electrocardiographic tracing. It is not uncommon to find such an irregularity of the heart unaccompanied by any symptoms or any evidence of cardiac decompensation. Among the complications which may result from a fibrillating heart are emboli, which may lodge either in the lungs or in the cerebral vessels, giving rise to pulmonary infarcts or hemiplegia.

Paroxysmal Tachycardia.—Characterized usually by a history of a sudden attack of rapid heart action which ends abruptly, the rate found somewhere between 130 and 200 per minute. The condition may last from a few minutes to many days and usually carries with it annoying symptoms of dyspnea, nausea, vomiting, palpitation, etc.

Auricular Flutter.—Not diagnosed by physical examination. It may be suspected, however, when the pulse rate is high and can be proved by electrocardiographic tracing. It belongs to a class which will be taken up in the next paragraph, and usually runs a two to one, three to one, or four to one block. The condition also frequently passes over into auricular fibrillation.

Heart-block.—Usually suspected where there is a history of attacks of unconsciousness occurring in the middle period of life or where the pulse rate is markedly slow. A heart rate below 50 should warrant electrocardiographic tracings to check up on this possibility. Complete serological, radiographic, and electrocardiographic investigations are indicated for the full analysis of this condition.

Pulsus Alternans.—One of the most serious irregularities of the heart, indicating serious impairment of the myocardium. It consists of a regular alternation of strong and weak beats, although the rhythm is not interfered with. It is believed to be due to inability of all the cardiac muscle to contract during each systole, some fibers resting in the alternate beat. It is rarely encountered in the process of a routine physical examination, as it is not frequently found in ambulatory cases. The sphygmomanometer is the best means for detecting the condition clinically, and in the taking of the blood-pressure it has frequently been found. When the systolic blood-pressure is read in such a case, the pulse below the compression cuff is exactly halved, but doubles its rate as the mercury column is allowed to recede. Practically every case can be demonstrated by the use of the polygraph, and electrocardiographic tracings will sometimes reveal information.

Angina Pectoris

This condition occurs more frequently in men than in women and may be primary or secondary. A history of sub-

sternal pain or pain in the upper abdomen, worse after meals and on exercise, particularly if radiating to the left shoulder or down the inner surface of the left arm, should prompt, in addition to a careful heart examination, a thorough cardiac study, including electrocardiogram, *x*-ray plate, blood test, etc. In connection with a history of suprasternal pain the question of aortitis has also to be considered. This is verified by history and by radiographic evidence of enlargement of the aorta by a plate taken at a distance of 6 feet.

Diseases of the Aorta

Aneurysm of the thoracic aorta is usually not recognized or suspected during a casual examination of the chest, unless there are very definite signs or symptoms pointing to the presence of such a condition. More often it is found accidentally, where *x*-ray films of the chest have been taken. Aneurysm may be indicated by a pulsating tumor mass in the neck or a pulsation of the chest wall in the region of the base. It may be suspected when there is basal enlargement of the heart or pressure upon a bronchus, recurrent laryngeal nerve, or sympathetic ganglion. Unequal radial pulses, also retardation or obliteration of the radial pulse, is very suggestive of aneurysm. Complete obliteration of both radial pulses is sometimes encountered.[1]

Aneurysm without signs usually involves a descending arch or some part of the thoracic aorta. Thoracic aneurysm usually gives signs in the lungs by interference with the passage of air through the bronchus or bronchi on one side. The diagnosis is finally made by fluoroscopic examination, observing a pulsating tumor or by a heart picture taken at a distance of 6 feet. A brassy cough, hoarseness, or inequality of the pupils should prompt careful examination to exclude aneurysm and make advisable an *x*-ray plate and serological examination. It is to be remembered that the larger percentage of aneurysms are due to syphilis. Abdominal aneurysm is most frequently seen in the epigastric region. It is characterized by palpable expansile tumor and associated with a history of syphilis and of abdominal pain. This pain becomes acute and of a "boring"

[1] Bilateral Pulse Obliteration in Thoracic Aneurysm, by J. Ramser Crawford, Journal American Medical Association, May 21, 1921, p. 1395.

character when there is erosion of the vertebræ. Aneurysm of the extremity, particularly of the popliteal region, is recognized by the presence of an expansile tumor. Over it a systolic bruit may be heard.

Aortitis usually indicates syphilis of the aortic arch and is frequently associated with aortic valvular disease. It is more common in men than in women and usually appears after the thirty-fifth year. On physical examination a blowing systolic murmur is frequently found over the aortic region. *x*-Ray shows definite dilatation of the aortic arch, but not of the sacculated, aneurysmal type. Positive Wassermanns are usually obtained in these cases.

Diseases of the Peripheral Vessels

Endarteritis is usually recognized by a history of pain often associated with some chronic disease, as syphilis or diabetes. Palpation of the blood-vessels and *x*-ray help to identify the condition. The appearance of gangrene of an extremity clinches the diagnosis.

The so-called "endarteritis obliterans" should be sought for. It is characterized by a history of numbness and tingling of the lower extremities, one or both, and later by intermittent pain on exercise, cramp-like in character. Palpation of the dorsal artery of the foot in such cases fails to show evidence of pulsation. The condition is a progressive one, usually terminating in gangrene. In this condition investigation should be made as to habits in the use of alcohol, tobacco, etc. Focal infection should be excluded and blood examination and a complete serological analysis made.

Arteriosclerosis.—This well-known and wide-spread condition was probably first described years ago under the name of "arteriocapillary fibrosis" by Gull and Sutton. The condition is so well known and so fully described in various books on pathology that it hardly seems necessary to go into it in detail in this manual. We do deem it important, however, to mention that arteriosclerosis is not necessarily a disease of old age. Definite thickening of the arterial walls is frequently found in young adults.

Another point to be stressed is the well-known fact that for some unknown reason arteriosclerosis seems to invade

certain parts of the arterial system, leaving the remainder, practically free from the disease. Therefore, if a physician finds marked thickening of the walls of the radial arteries, he must not assume that the internal organs, such as the heart or brain, are necessarily involved; and, conversely, if the walls of the radial arteries are soft and compressible, he must not fall into the error of concluding that cerebral or coronary arteriosclerosis does not exist.

Functional Tests

The pulse and heart action should be tested after an effort has been made to allay nervousness, and also after exercise in

Fig. 18.—Exercise for testing cardiac reserve. The dumb-bell is swung through the legs, then straight up over the head, repeating the movement fifteen times. Under average conditions the 10-pound weight is used for men and the 5-pound weight for women.

order to determine the reserve capacity of the heart muscle. If there is doubt as to the integrity of the heart, it is quite as important to ascertain the condition of the heart muscle as to map out the areas and diffusion of murmurs. Physicians should use judgment and discretion in applying the exercise test to those who present evidence of incompetency of the heart or of high blood-pressure.

The men examined should use a 10-pound dumb-bell and the women a 5-pound dumb-bell. The examinee holds the

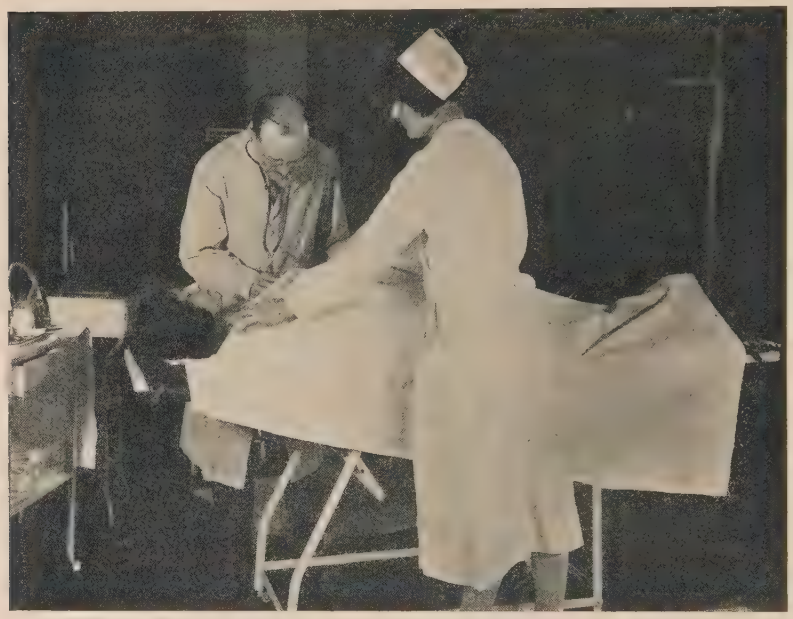

Fig. 19.—Examining the heart in the recumbent position after exercise.

dumb-bell in both hands, stands with the feet apart, and bends the body forward so that the spine is about parallel to the floor. The dumb-bell is then swung to a position above the head, keeping the arms approximately straight. This is repeated fifteen times. The whole exercise should take about thirty seconds. The pulse rate is counted for ten seconds immediately after the exercise and the rate calculated from this. It is counted again two minutes later. The blood-pressure reading is then taken. If the pulse and blood-pressure do not

return to normal within that time, lack of cardiac reserve may be suspected. The heart should be re-examined in the erect, the recumbent, and left lateral positions immediately after exercise.

Supplementary Investigations

In heart examinations it is important to bear in mind that the final interpretation of the status of the heart depends not upon one or more signs elicited by physical examination, but upon the picture as a whole. For example, evidence of an auricular fibrillation may be found and proved by electrocardiography, and the source of this irregularity may be revealed either in small, buried tonsils, or at the apex of some apparently innocent-looking tooth. Further, a loud, blowing systolic murmur heard best at the apex, as yet not investigated by *x*-ray and with a negative history of diseases in which the heart is frequently affected, may be finally adjudged to be functional.

The more laboratory aids are employed (particularly the *x*-ray) in checking up evidences of cardiac enlargement, the larger the percentage of error found in individual instances in percussing the heart. For accuracy, therefore, a plate taken at a tube-plate distance of 6 feet is imperative. Not infrequently the shape of a heart as disclosed by an *x*-ray study may help in formulating an opinion as to an existing valvular disease. Likewise, repeated *x*-ray plates of an individual heart may disclose evidence of enlargement, on the one hand, which may be attributed to cardiac hypertrophy or dilation, and subsequently may be found to be so markedly decreased as to point to the presence of fluid.

It is also to be remembered that angina pectoris may present itself initially as a neuritis, either unilateral or bilateral, or as a complaint of indigestion; but that more often it is found dissociated from any evidence of disease of the heart as disclosed by physical examination. Therefore, in every instance where confusion might arise, the individual should be given the benefit of the doubt and carried through a very searching investigation. A routine *x*-ray of the heart would discover dilatation of the aorta and the existence of aneurysm, which do not manifest themselves either by symptoms or physical signs.

In all types of cardiac irregularity a thorough investigation should be made for focal infection, with investigation of the habits of the individual in regard to tea, coffee, tobacco, and alcohol, as well as of the state of the bowel elimination.

Evidence of aortic disease calls imperatively for a blood Wassermann test, as the two most common causes of aortic valvular disease are syphilis and rheumatic fever.

The special tests and diagnostic measures listed below are indicated:

Valvular disease of heart:
- *x*-Ray of heart.
- Blood Wassermann test.
- Blood-culture (if temperature is above normal).
- Kidney function tests.
- Search for focal infection (*x*-ray of teeth, *x*-ray of sinuses, tonsil culture, gastro-intestinal *x*-ray, including gall-bladder, prostatic smear, etc.).

Displaced heart:
- *x*-Ray of heart.
- *x*-Ray of gastro-intestinal tract (for transposition of viscera).
- Blood Wassermann test.

Asthma:
- *x*-Ray of heart and chest.
- Electrocardiogram.
- Search for focal infection.
- Protein sensitization test.
- Kidney function tests.
- Blood Wassermann test.

Angina pectoris:
- *x*-Ray of heart.
- Electrocardiogram.
- Search for focal infection.
- Kidney function tests (if high blood-pressure).
- Blood Wassermann test.

Irregularities:
- Electrocardiogram.
- *x*-Ray of heart.
- Search for focal infection.
- Blood Wassermann test.

High blood-pressure:
x-Ray of heart.
Electrocardiogram.
Search for focal infection.
Kidney function tests.
Blood Wassermann test.
Low blood-pressure:
Search for focal infection.
Blood Wassermann test.
Blood-count.
x-Ray of chest.
Sputum examination.
Basal metabolism.
Vascular thickening:
Search for focal infection.
Kidney function tests.
Electrocardiogram.
Blood Wassermann test.
Aneurysm:
x-Ray of heart.
Blood Wassermann test.
Gastro-intestinal *x*-ray (if abdominal).
Endarteritis:
Blood Wassermann test.
Search for focal infection.
x-Ray of vessels.
Blood-sugar determination.

In his recent excellent volume, "Facts on the Heart," Dr. Richard C. Cabot states it as his conclusion that in most cases where heart disease is suspected by the patient or diagnosed by the physician, the heart is normal, as found at necropsy. His study is based upon nearly 2000 cases, showing definite evidence of cardiovascular disease, going to autopsy between the years 1896 and 1919 at the Massachusetts General Hospital. Beginning with the findings of the pathologist, he followed the plan of working back into the corresponding clinical records.

Many of the facts disclosed tend to upset the text-book viewpoint which has become almost traditional regarding certain affections of the heart. He calls attention to the fact

that in the great majority of instances of acute and chronic pericarditis the diagnosis is either wrongly made or the condition entirely overlooked. He further states that mitral regurgitation and myocarditis cannot be recognized clinically and that they have no place in diagnostic terminology. He points out the futility of relying upon systolic murmurs as a diagnostic aid, regardless of intensity or transmission, and states that the transmission seems proportionate to the loudness of the murmur. This view regarding the diagnostic value of systolic murmurs has, of course, been held by many for some time, but probably never before has it been substantiated by a large number of cases in which the necropsy findings were known.

Dr. Cabot in this study simplifies the classification of heart disease by making three main divisions which, he maintains, comprise more than 90 per cent. of all heart affections. These are:

Rheumatic.—Primarily a disease of youth; most common in young women, affecting mainly the mitral valves in the form of a stenosis.

Syphilitic.—Usually occurring between the thirty-fifth and forty-fifth years; much more common in males than in females; generally occurring as an aortitis or as aortic valvular disease.

Hypertensive.—Usually occurring after the age of fifty; twice as common in men as in women.

The remaining 9 per cent. consists mainly of acute and subacute streptococcus endocarditis and acute and chronic pericarditis. The percentage of congenital defects and thyrotoxic disease is very small.

One of the interesting points brought out by Dr. Cabot is that the hypertensive type of heart affection comprises 77 per cent. of all heart cases and is not necessarily associated with elevation of the blood-pressure. Such hearts are enlarged or dilated, or both enlarged and dilated, but reveal normal valves at autopsy. These cases are often wrongly diagnosed as myocarditis, mitral regurgitation, "cardiorenal disease," or "senile heart."

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Section 7

THE RESPIRATORY SYSTEM

Introduction by Lawrason Brown, M. D.

The knowledge among the laity concerning diseases of the lungs, due in large part to the propaganda instituted some twenty years ago by the National Tuberculosis Association, brings many individuals to consult physicians for periodic physical examinations. The training in the examination of the lungs which many physicians received during the World War has been of great benefit to the general public. In many communities the advanced consumptive is now rarely seen outside the hospital. Many patients with pulmonary symptoms now demand that pulmonary tuberculosis be either diagnosed or excluded. The problem is constantly growing more difficult, and with the more careful physical examinations, more and more slight abnormalities are discovered. Today it is far from easy to exclude pulmonary tuberculosis in many cases, and in no small number no less difficult to speak positively of its presence.

It is a wise plan to formulate and follow certain rules. Certain areas of the lungs are more often involved by certain diseases than others. For instance, in the vast majority of cases the abnormal physical signs in pulmonary tuberculosis occur first above the third rib and third vertebral spine. Similar signs at the base should not be considered as due to tuberculosis until proved to be so. The intermediate area is, of course, subject to either type of disease. A similar law holds for the *x*-ray plate, where, indeed, tuberculosis should not be diagnosed until definite mottling is seen. A good working rule is that moderately coarse râles above the third rib and third vertebral spine are to be considered as due to tuberculosis until disproved, while the converse holds for the base.

Idiopathic pleurisy with effusion demands always careful study, and, even in case no evidence of pulmonary tuberculosis can be discovered, treatment for two or three months.

A slight amount of blood spitting may occur in any pulmonary disease, but when the amount reaches a dram at any one time and no other cause can be found for it, a tentative diagnosis of suspected pulmonary tuberculosis should be made and treatment for two or three months advocated.

In every abnormal pulmonary condition lasting over three weeks, sputum, when present, should be examined for tubercle bacilli. In brief, pulmonary tuberculosis should not be positively diagnosed unless there has occurred one or more of the following: hemoptysis of a dram or more, unexplainable pleurisy with effusion, râles (usually moderately coarse in character), or mottling in the *x*-ray film above the third rib and third vertebral spine, or indeed, tubercle bacilli in the sputum. Absence of all five of these diagnostic criteria justifies exclusion of pulmonary tuberculosis.

Skill in assembling the data is presupposed. Pulmonary tuberculosis is emphasized in this way, for it is by far the most usual pulmonary disease in ambulent patients, *i. e.*, those who seek periodic physical examinations.

The association of excessive cough, foul sputum, and very often distant breathing, as the only abnormal physical sign, suggests at once pulmonary abscess. Excessive pain with unusual physical signs or with pleural effusion points to pulmonary tumor.

As a matter of fact, if the necessity be borne in mind of excluding syphilis in general disease and pulmonary tuberculosis in all diseases of the lungs of any duration, the diagnostic failures of the medical profession would be greatly diminished.

Examination of the Respiratory System

The examination of the thorax is usually carried out with the subject standing. At times, however, this examination is best made with the examinee seated or lying upon the examining table. Individuals showing extreme weakness or those presenting evidence of dyspnea should be examined upon the table. Small children are most conveniently examined while seated upon the table. The examiner must use his own judgment, however, in selecting the position most appropriate in each

case. In all instances the part under immediate scrutiny must be devoid of garments and drapings.

Types of Thorax

In classifying the thorax according to shape we may consider two main divisions: (1) the *symmetrical* thorax and (2) the *asymmetrical* thorax.

The *symmetrical* thorax includes the following:

1. Normal chest.
2. Alar chest (with spreading wing-like scapulæ).
3. Flat chest.
4. Rachitic chest.
5. Pigeon breast.
6. Barrel-shaped chest.
7. Bilateral retracted chest.
8. Funnel breast.

The *asymmetrical* thorax includes:

1. Unilateral enlargement.
2. Unilateral diminution.
3. Local bulging.
4. Local retraction.
5. Distorted chest (the result of kyphosis, scoliosis, infantile paralysis, and pleuritic adhesions).

The normal thorax in the adult is ellipsoidal in general shape. In contours it is smooth and regular, and there is a lack of deep hollows and depressions. There is very little depression about the clavicles.

The chest is symmetrical during respiration and the ribs move freely without calling into play the accessory respiratory muscles. Its diameter is greater from side to side than from before backward and greatest in its vertical axis.

In palpation, percussion, and auscultation of the back of the chest, have the subject fold his arms in front, placing his hands on opposite shoulders, so as to expose more lung surface by the resulting outward rotation of the scapulæ.

Inspection

Place subject in a good light and note the following:

1. The general appearance of the subject for anemia, pallor, nutrition.

2. The shape of chest, whether normal, barrel, funnel, flat, pigeon, etc. Observe the subcostal angle.
3. The length of the neck and whether or not the accessory respiratory muscles are called into play.
4. Equality of expansion of both sides of the chest on normal and on deep inspiration, inspection made from both front and back. Note whether chest moves as a whole, and whether the lower costal margin flares up.
5. Abnormal depression of supra- or infraclavicular fossæ and suprascapular region.
6. Restricted respiration due to pain of pleurisy, etc.
7. Bulging of interspaces from pleural effusion, emphysema, etc.
8. Presence or absence of scoliosis, lordosis, etc., suggestive of previous Pott's disease and other diseases.
9. Pupils of the eyes. In unilateral tuberculosis the pupil on the affected side may be larger than the other. Inspect the finger-nails; the longitudinal curvature of the nail in tuberculosis, either active or arrested, may frequently be found to be accentuated. Also record clubbing, which may be a sign of tuberculosis, pulmonary abscess, bronchitis, emphysema, or other intrathoracic conditions which hinder the venous return.

Palpation

Determine comparative tactile fremitus of the two sides of the chest in the usual manner, using the same hand alternately on either side of the chest, both front and back. Bear in mind that in people with high-pitched voices (women and children especially), fremitus over the lower lobes posteriorly is apt to be greatly diminished or absent. Where new growth of the lungs is suspected, an attempt should be made to determine the presence of gland enlargement above the clavicle.

Percussion

Starting with the clavicles, use immediate percussion, first on the inner third of each clavicle, then the middle and outer thirds. Proceed down the anterior aspect of the chest, com-

paring interspace with interspace, being careful each time to place the pleximeter finger firmly between the ribs and not on them. One or two blows with the percussion finger is sufficient; where several blows are struck the intensity of each is apt to differ somewhat from the others, making it difficult to carry tone from one side of the chest to the other with accuracy. Percuss the back of the chest in the same manner, but from below upward, paying particular attention to the apices, interscapular region, and bases. Percuss each axillary region, the subject clasping his hands above his head.

Bilateral hyperresonance is usually indicative of emphysema. Unilateral hyperresonance may suggest to the examiner the presence of pathology in the opposite lung (such as fluid, massive consolidation, new growth, etc.).

Auscultation

Instruct the subject to breathe regularly and deeply through the mouth, avoiding harsh breathing and "snoring" as far as possible. Auscultate front of chest as usual, determining character of breath sounds and presence or absence of râles which are indicative of tuberculosis or chronic bronchial conditions, asthma (bronchial or otherwise), pleurisy, etc. Instruct the subject to breathe as before, but giving a short sharp cough at the very end of expiration, following it with a moderately deep breath.

Using this procedure, go over the entire chest again, both front and back, as well as in the axillary region. In this way determine the presence or absence of constant râles, paying special attention to the supra- and infraclavicular regions; also the interscapular and infrascapular regions.

Occasionally the examiner must decide whether the sounds heard are râles or are caused by hair on the chest striking the diaphragm of the stethoscope. In the latter case, apply vaselin or lubricating jelly and smooth the hair down.

On auscultation note the following:

1. Character of breath sounds: normal, bronchial, cog-wheel, amphoric, absent.
2. Presence or absence of râles; kind of râles with place in respiratory cycle, and whether constant or inconstant; friction-rubs.

3. Absent breath sounds (suggesting pleurisy with effusion, pneumopyothorax, occlusion of bronchi (complete), aneurysm, enlarged mediastinal glands, hemorrhage, pressure from tumors).
4. Change in voice sounds, both spoken and whispered.

Succussion

In cases of hydropneumothorax or pyopneumothorax, splashing sounds can sometimes be heard with the stethoscope on the thorax when the subject moves suddenly or the chest is shaken.

Mensuration

Measurements of the chest should be made and recorded. The circumference is taken at the level of the fifth rib anteriorly where it crosses the midclavicular line. The tape is not drawn too tightly, but simply makes contact with the skin throughout.

The measurements should be taken, first, after forced inspiration; second, after forced expiration; third, intermediate (at rest).

Aspiration

In cases where pleuritic fluid, either exudate or transudate, or lung abscess is suspected, aspiration performed under strictly aseptic conditions may be of value for purposes of confirmation and should be recommended in summarizing the case.

x-Ray

In a complete physical examination of the thorax the *x*-ray has come to be just as important as inspection, palpation, percussion, and auscultation, though in no sense superseding these time-honored methods of examination. The *x*-ray examination is divided into the fluoroscopic and the radiographic, both of which methods should be employed.

In the fluoroscopic examination the movements of the bony thorax and diaphragm during respiration can be studied at many different angles. The extent of aëration of the lungs can be viewed and comparison made with the opposite side.

In the radiographic method the various structures cannot be examined in motion, but this method has the following advantages:

1. A permanent record (comparison with previous and future radiograms).
2. Better definition.
3. Better proportion.

Respiratory Diseases

In the following paragraphs an attempt has been made to list (and in some instances briefly describe), under the component parts of the respiratory apparatus, the more common conditions encountered in routine health examinations.

Larynx.—Examination of the larynx is considered in Section 4 (The Nose, Throat, and Ear), Section 6 (The Circulatory System), and Section 10 (The Nervous System), which deals with paralysis of the vocal cords due to pressure on the recurrent laryngeal nerve.

Trachea.—Tracheitis, both acute and chronic, is usually accompanied by more or less involvement of the larynx or bronchi. Pressure upon the trachea from aortic aneurysm, mediastinal tumors, tumors of the neck, and substernal thyroid might, by constricting the lumen, give rise to a brassy, metallic cough.

The trachea is subject to benign and malignant tumors, such as fibroma, chondroma, papilloma, and carcinoma.

The tracheal tug sign in aneurysm is considered in Section 6 (The Circulatory System).

Bronchi.—Some of the commoner conditions which involve the bronchial tree are:

1. Acute bronchitis.
2. Chronic bronchitis.
3. Fibrinous bronchitis.
4. Bronchiectasis.
5. Tuberculosis.
6. Tumors of the bronchus.
7. Stenosis of the bronchus.
8. True bronchial asthma.
9. Foreign body.

The physician should be extremely cautious in rendering a diagnosis of bronchitis. Many cases of so-called "simple chronic bronchitis" have been found, on further examination, to present extensive tuberculosis throughout both lungs. The examiner should be mindful of the frequency with which symptoms and signs of chronic bronchitis occur as the result of cardiac decompensation of lesser or greater degree. Before reaching a conclusion as to the presence of bronchitis, tuberculosis, asthma, renal or cardiac, must be definitely excluded. Remember that in true bronchial asthma the dyspnea is expiratory in type, while in the renal and cardiac variety it is inspiratory.

Primarily, bronchial asthma is a spasm of the musculature of the bronchioles, although some authors regard the condition as being due to psychogenic causes, and others, to a neurosis of the pulmonary portion of the vagus nerve. However, it is well to remember that neurotic tendencies are to be found in many asthmatics.

Regarding asthma as an anaphylaxis, effort should be made to determine the offending protein by the protein sensitization test.[1] In this test it is best to use all of the proteins with which the subject may have come in contact, such as:

1. Epidermal structures which include—
   - Horse dander.
   - Goose feathers.
   - Dog hair.
   - Cat hair, etc.
2. Foods.
3. Pollens from—
   - Trees.
   - Flowers.
   - Grasses.
   - Weeds, etc.
4. Bacteria—those invading the respiratory tract.

The family history in cases of any protein sensitization is extremely important—over 60 per cent. of sufferers giving a positive family history of hypersensitivity. The *tendency* to hypersensitivity would seem to be inherited. The history of the individual afflicted with asthma should include:

[1] For further discussion of protein sensitization, see Section 4, p. 62.

1. The season of the year at which the attack occurs. (Valuable in determining pollens and bacterial sensitiveness.)
2. Domestic animals.
3. Habits; occupation (especially of fur dealers and individuals working in dusty, damp places); use of feather pillows and mattresses.
4. Diet.—(Foods are important causative agents in cases of bronchial asthma before the age of five years.)

The subject suffering with a true asthmatic condition complains first of noting a sense of constriction or pressure about the chest; dyspnea of the expiratory type associated with wheezing and coughing. The cough is productive of a characteristic thin, mucoid phlegm containing rounded, gelatinous masses known as the "perles of Laennec."

Auscultation of the chest during and following an asthmatic attack reveals dry, musical râles, wheezes, and peeps. In long-standing cases evidences of emphysema are marked. Asthma due to cardiac and renal defects must be carefully distinguished from bronchial asthma due to hypersensitivity. The dyspnea in true asthma, as stated above, is always expiratory, while cardiac asthma is inspiratory.

The Hilus (*Lung Root*).—The hilus of the lung as revealed by *x*-ray examination shows considerable variation within normal limits, yet usually occupies the region on either side of the vertebral column corresponding to the level of the sixth, seventh, and eighth interspaces posteriorly. It is composed principally of blood-vessels, bronchial tubes, lymphatics, areola tissue, and lymph-nodes, and is subject to the following conditions:

1. Hypertrophy and hyperplasia of the peribronchial lymph-nodes.
2. Simple adenitis.
3. Tuberculosis.
4. Hodgkin's disease.
5. Lymphosarcoma.
6. Abscess.
7. Cyst.

Differentiation of these conditions is dependent upon:

1. The history.
2. The *x*-ray examination.
3. Complete blood-count.

4. Microscopic examination of metastatic nodes.
5. Examination of the sputum.

The Lungs

In chronic ulcerative tuberculosis of the lungs the physician should remember the eight types according to the mode of onset (as given by Osler), since pulmonary tuberculosis frequently resembles other conditions which involve the lungs and also systemic diseases. These types are:

1. *Latent*—in which the disease remains dormant for months or years and is discovered accidentally, *e. g.*, during examination for life insurance.

2. *Gastro-intestinal* and *anemic*—in which the symptoms of dyspepsia or simple secondary anemia predominate.

3. *Malarial*—associated with chills and fever.

4. *Pleuritic*—which begins with all the signs of pleurisy.

5. *Laryngeal*—associated with huskiness of the voice. This is produced reflexly, or may even be due to actual tuberculosis of the laryngeal structures.

6. *Hemoptysis*—this being the first sign.

7. *Glandular*—in which the cervico-axillary nodes are affected.

8. *Bronchial*—in which signs of an ordinary bronchitis are present.

The question of activity in pulmonary tuberculosis is not to be based upon stethoscopic or radiographic evidence alone, but upon the following:

1. Loss of weight.
2. Persistent slight elevation of afternoon and evening temperature.
3. Cough.
4. Hemoptysis.
5. Increased pulse rate and low blood-pressure.
6. Undue rapidity of the pulse on slight exertion.
7. Loss of appetite.
8. Anemia.
9. Night-sweats.
10. Fatigue.
11. Extension of process.
12. Positive sputum.

It is to be remembered that chronic pleurisy is frequently the result of tuberculous infection.

In *pulmonary emphysema* the chief symptoms are shortness of breath, cough, and expectoration. The chief signs are:

1. Barrel-shaped chest.
2. Relatively short neck.
3. Diminished movement of the thorax during respiration.
4. Use of the accessory respiratory muscles.
5. Cyanosis.
6. Hyperresonance.
7. Clubbing of the fingers.
8. Diminished voice and breath sounds.
9. Diminished cardiac dulness.
10. Displacement of the heart.
11. Distant heart sounds.
12. Dyspnea.

Below are enumerated some of the uncommon conditions which may be encountered during physical examination:

1. Embolism and infarct.
2. Metastatic tumors.
3. Abscess.
4. Cysts.
5. Pneumoconiosis (as shown by *x*-ray).
6. Actinomycosis, blastomycosis, and glanders.

Pleurisy.—In acute and chronic pleurisy not associated with or following pneumonia the physician should be on his guard for tuberculosis as a causative factor, particularly when there is effusion into the pleural cavity.

Primary new growths of the pleura are usually endotheliomatous, and in addition to the ordinary signs of pleurisy the effusion when present is usually tinged with blood. The diagnosis of such cases has been confirmed by microscopic examination of a stained specimen obtained by centrifuge.

Hydrothorax is the result of circulatory embarrassment and is most commonly cardiac or renal in origin. If cardiac, it is usually unilateral; but if due to renal disease or is part of a general anasarca, it is bilateral.

Pyopneumothorax is the result of rupture of the parietal or visceral pleura (pathological or traumatic), followed by escape of air into the pleural cavity and collapse of the lung. Infec-

tion usually takes place through the rent in the pleura. In the early stages *x*-ray examination shows characteristic changes.

Empyema may involve the entire pleural cavity or it may be localized (incapsulated by adhesions).

Other conditions which involve the pleura are thickening and adhesions of the pleura.

The Mediastinum

Some of the diseases of the mediastinum are:

1. Mediastinitis.
2. Hodgkin's disease.
3. Lymphosarcoma.
4. Abscess.
5. Cysts.
6. Syphilis.
7. Tuberculosis of the mediastinal nodes.
8. Pericardial adhesions.
9. Aneurysm.

The Diaphragm

A study of the movements of the diaphragm behind the fluorescent screen is of considerable value in early cases of pulmonary tuberculosis by revealing fixation, spasm, and lagging of the diaphragm on one side during respiration.

Eventration of the diaphragm is usually unilateral, and is the result of pressure from beneath by a dilated stomach or by an enlarged and upward displaced splenic flexure of the colon. This condition is usually unsuspected until attention is directed to it during the study of *x*-ray films of the chest. It is not to be confused with true hernia of the diaphragm in which the stomach or intestine escapes through an opening in the diaphragm into the thoracic cavity causing pressure upon the lungs. Hernia is usually a congenital anomaly, but may result from sudden violent increase of intra-abdominal pressure. When such accidents occur it is in cases where the diaphragm itself is diseased or weakened or where there is paralysis or lack of tone in the muscle itself. Barium taken internally in such cases will be found high in the thorax on *x*-ray examination.

Adhesions of the diaphragm are usually the result of an old pleurisy or tuberculosis.

Litten's Shadow Sign.—This phenomenon is best observed with the subject recumbent with feet toward the window or source of light. Standing with his back to window the examiner notices the movement of the shadow over the lower intercostal spaces during inspiration. This shadow is produced by contraction of the diaphragm and descent of the normal lung, thereby causing an indrawing of the interspaces.

If the shadow is absent on one side, it indicates paralysis, adhesions, or abnormalities of the base of lung or pleural cavity.

Supplementary Investigations

Where there is definite history of former tuberculosis, hemoptysis, chronic cough, considerable loss of weight over a comparatively short period of time, and continual unexplained elevation of temperature the following tests are indicated:

x-Ray of chest (including fluoroscope).
Numerous sputum analyses.
Complete blood-count.
Observation by physician at frequent intervals.

In addition, it is well to have these tests carried through as a matter of precaution when light weight, low blood-pressure, anemia, loss of weight, and palpation are present.

When symptoms of bronchial asthma are present, the following tests should be recommended:

x-Ray of chest and heart.
Protein sensitization.
Blood chemistry.
Urine concentration.
x-Ray study of the heart and lungs.

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Section 8

THE ABDOMEN AND GASTRO-INTESTINAL SYSTEM

Introduction by Anthony Bassler, M. D.

The importance of searching for organic, infective, and malignant disorders of the abdominal organs in the course of the periodic health examination need not be stressed. At least one-third of the diseases falling within the field of internal medicine are found in these organs and in derangements of metabolism. While the stomach itself is subject to but few diseases, they are of the utmost importance because of the frequency of ulcer and cancer. The functional disorders are even more numerous and significant in the consideration of general health matters.

The greatest part of our knowledge relating to gastro-intestinal diseases has developed in the last quarter of a century, and as time goes on each year brings this field of work into wider prominence and links it more closely to all the other medical specialties.

During recent years much has been learned regarding the infective, parasitic, biological, and biochemical processes involving the digestive tract, with their resulting chronic toxic influences on highly specialized tissues of the body. In the periodic health examination, as well as in casual examination, it should be remembered that diseases of the liver, gall-bladder, and bile-ducts, as well as the metabolic disorders of diabetes and gout and some of the secondary anemias and chronic joint diseases, may be traced directly to pathological processes taking place in the intestinal tract. Such apparently unrelated conditions as recurrent neuritis, neurasthenia, frequent headaches, endocrine disorders, persistent skin eruptions, functional eye conditions, rhinitis, heart, kidney and vessel changes may also be traced directly to toxic substances produced in the intestinal tract.

Interpretative history taking, complete physical examination, roentgenographic, endoscopic, laboratory, chemical, and bacteriological examinations are all highly important agencies in investigating symptoms related to this region. The discovery of such conditions before they become chronic is one of the distinct advantages of health examination work.

Health is the most precious of all human assets. It should be carefully guarded. Personally I know of no better health insurance or assurance than the periodic health examination. In the gastro-intestinal field it is most important for the public to recognize this and for the profession to enter into it most thoroughly.

Examination of the Abdomen and Gastro-intestinal System

The recumbent position, feet drawn up and knees fully flexed, is the best means of obtaining the complete relaxation so necessary to thorough palpation of the abdominal wall and the underlying viscera. Muscle resistance can be further diminished in certain instances (markedly obese individuals) by anterior flexion of the spine through slight elevation of the head of the table. The arms should be at the sides and the bladder emptied before examination. A systematic procedure must be adopted and followed as a routine with few exceptions (necessitated by individual requirements).

For the purpose of accurately recording physical findings the abdomen is divided into quadrants by bisecting the linea alba at the level of the iliac crest at its highest point.

The order of procedure should be:

1. Inspection.
2. Palpation:
   - General.
   - Lower left quadrant.
   - Lower right quadrant.
   - Upper left quadrant.
   - Upper right quadrant.
3. Percussion.
4. Auscultation.

Inspection

With good illumination overhead, stand to the right of subject and some little distance away. Direct him to breathe deeply and slowly through the mouth, relaxing the abdominal muscles. (In most instances relaxation will be obtained in this way, but in some it will be necessary to divert attention by resorting to conversation not connected with the examination.)

Note the character of the abdomen (scaphoid, rotund, protruding, pendulous). Note whether the skin is loose (suggesting loss of weight); or tight and glistening (suggesting increased tension, as in obesity, ascites, tumor, pregnancy, etc.).

Note movement during respiration, and whether diaphragm descends normally or lags on one side.

Note irregularities of contour and visible pulsation.

See if superficial veins are dilated. Note asymmetry.

Is respiration abdominal or thoracic? Look for peristaltic waves.

Palpation

General.—Superficial palpation of the abdominal wall with the tips of the fingers should be quickly made to note muscle tone, diastasis of the recti, tumors of the abdominal wall, tenderness, epigastric hernia (dimple in midline above umbilicus), umbilical hernia, etc. Differentiate between superficial and deep tenderness.

Feel thickness of abdominal wall between the fingers. Is there localized or general rigidity? Are the linea alba, linea semilunares, and linea transversæ abnormally resistant?

Determination of these conditions is important before deep palpation is begun. Too often the transverse lines are mistaken for liver edge; or the border of the rectus for tumors, impacted feces, appendix, etc. Doubtful intra-abdominal tumors should be re-examined after thorough catharsis.

Lower Left Quadrant.—If definite symptoms brought out in the history point to pathology in any particular quadrant, this region should be examined last; otherwise, begin with the lower left quadrant. Use the fingers of both hands, beginning near the anterior spine of the ilium, sweeping downward into the iliac fossa and toward the midline.

The following conditions should be kept in mind during this part of the examination:

1. Tumor of the ilium.
2. Impacted feces and tumors of the sigmoid and rectum.
3. Diverticulitis of the sigmoid.
4. Tumors of the prostate.
5. Abnormalities of the mesenteric and lumbar lymph-nodes.
6. Distention of the urinary bladder.
7. Adnexal disease, tumors of the uterus, and pregnancy.

Fig. 20.—In palpating the abdomen the examiner should note any change in the facial expression of the subject. The abdomen is again carefully palpated after the feet have been drawn up and the abdominal muscles relaxed.

Lower Right Quadrant.—With both hands examine this quadrant by beginning at the midline and working toward the iliac crest. In addition to many of the conditions sought for on the left side, attention should be directed to abnormalities of the appendix and cecum. Remember that undue pressure over the appendix will elicit tenderness even in normal individuals.

Do not mistake the border of the rectus muscle or the iliopsoas group of muscles for abnormalities. In thin subjects (and particularly when the physiological lordosis is exaggerated) the anterior surfaces of the lumbar vertebræ are readily palpated and the intervening soft tissues are more or less tender. In such cases the abdominal aorta is easily palpated (above the umbilicus) in front of and a little to the left of the vertebræ. Normally it is tender and pulsating.

Upper Left Quadrant.—Palpate with the palm of the right hand flat upon the abdomen and the fingers directed toward and beneath the costal margin. Then reinforce the pressure with the unengaged hand. Now examine further, with the right hand on the abdomen and the left hand making counterpressure in the costovertebral angle.

Abnormalities to be looked for are:

1. Enlarged spleen.
2. Enlarged, movable, and floating kidney.
3. Tumors of the colon and greater curvature of the stomach.
4. Aneurysm of the splenic and renal vessels.
5. Tumors, cysts, and lymphatic enlargement of the mesentery.
6. Tumors of the left lobe of the liver.

Do not assume that the size and position of a normal stomach can be palpated. The greater part of the stomach occupies the left half of the abdomen, and it suffices to recall that in individuals either of normal or enteroptotic habitus the stomach is long and low, while in those of broad habitus the stomach is high and occupies a more horizontal position.

Occasionally the spleen is more readily palpated with the subject on his right side. Place the right hand over the left upper quadrant, pointing downward. Make counterpressure with the left hand behind and try to grasp spleen between the fingers during deep inspiration. Sometimes the kidney may be felt in the same way.

Upper Right Quadrant.—Place the right hand flat upon the abdomen with the middle finger near the costal margin and in the midclavicular line. During deep inspiration feel for the edge of the liver. Note to what extent, if any, it descends below the costal margin, and remember that even though it is felt

some little distance below the rib margin, it does not necessarily denote enlargement, but may simply mean ptosis. In such cases always percuss the upper limit of liver dulness. Note the character of the edge of the liver to determine whether it is smooth or rough, blunt or sharp, regular, irregular, nodular, or pulsating. The presence of tenderness suggests passive congestion, perihepatitis, and gall-bladder disease.

Do not mistake muscle spasm or transverse bands of the rectus for the edge of the liver or for enlargement of the gall-bladder or kidney.

Do not mistake direct transmission of a heaving cardiac impulse for pulsation of the liver, for in this condition other signs of marked passive congestion will be found.

Concomitant with the examination of the liver the gall-bladder region is carefully examined for abnormalities. Marked enlargement is easily recognized in thin and completely relaxed subjects. Feel for the groove separating it from liver. In suspected cases where nothing is found on ordinary palpation press deeply with the thumb near the tip of the ninth rib to elicit pain or tenderness. Tumors and ulcers of the pylorus and duodenum and tumors of the head of the pancreas must be thought of in examination of this region. Abnormalities of the right kidney are sought for as in the left quadrant.

Ptosis of the kidney and liver can be recognized in thin individuals by having the subject sit lengthwise upon the table, body bent slightly forward. Stand behind and place fingers beneath the costal margins and palpate during inspiration. This method will also be found of value in examining an enlarged or diseased gall-bladder. Another useful method is to palpate the hypochondrium on both sides during deep inspiration, the subject seated lengthwise on the examining table and reclining slightly upon the examiner, who sits sidewise on the table behind him.

Percussion

The indirect method is used in percussing the abdomen, although in certain instances thumping will be found advantageous. The entire abdomen should be systematically percussed. The conditions to be determined are the extent of distention present and whether it is localized or general. An attempt

should be made to percuss the spleen. The upper and lower limits of the liver should be carefully percussed. This is of especial importance in differentiating between enlargement and simple ptosis. In urinary retention the upper limit of the bladder should be mapped out.

When the flanks are dull or flat on percussion and fluid is suspected, the right and left sides of the abdomen should be percussed alternately, having the patient turn first on one side and then on the other in an attempt to determine the presence of shifting dulness. Now, with the patient on his back and, in the absence of an assistant, have him spread his fingers and dig them into the midline of the abdomen. A gentle tap is made with the fingers of the right hand in one flank, while the palm of the left hand is pressed against the abdomen on the opposite side to detect the presence of a fluid wave.

Auscultation

Auscultation of the abdomen is rarely used except in pregnancy, where it is important to determine the presence of fetal heart-sounds and the uterine souffle. It must be remembered that a bruit may be found over any abdominal tumor with dilated vessels near its surface. In thin individuals, when aortic regurtitation is suspected, auscultation over the abdominal aorta may be of some service.

A bruit over a normal aorta in cases of hypertension should not be mistaken for aneurysm. Splashing sounds in the stomach and increased peristalsis can sometimes be heard with the stethoscope.

Supplementary Investigations

It should be remembered that many cases of pulmonary tuberculosis have as their predominant symptom reflex gastric disturbances. Hence *x*-ray of the chest is indicated.

No diagnosis of acute epigastric pain is to be made until tabetic crisis can be excluded (cardinal signs and Wassermann).

Constantly increasing painless jaundice (in cachectic subjects) is frequently due to carcinoma of the head of the pancreas.

Nausea, vomiting, and abdominal pain may be due to incarcerated omentum in epigastric hernia.

Chronic digestive disturbances in females, "fat, fair, and forty," arouse suspicion of gall-bladder disease. There is probably no other abdominal condition that presents such a variety of signs and symptoms to baffle the clinician as chronic gall-bladder disease.

Direct *x*-ray of the gall-bladder in the majority of cases is not of very great value unless the gall-bladder is visualized by the tetraiodophenolphthalein sodium method. More can be learned indirectly by *x*-ray of the gastro-intestinal tract.

Repeated belching of gas at will is usually functional and the result of swallowing air.

It should be kept in mind that gastro-intestinal symptoms may be caused by pernicious anemia.

When purely psychic causes can be excluded, gastric disturbances, especially in individuals past middle life who do not respond to a carefully restricted diet within six to eight weeks, should be regarded as probably due to organic disease (ulcer, tumor, adhesions, gall-bladder, appendix, etc.).

It should also be kept in mind that developmental membranes, bands, adhesions, kinks, angulations in the region of the cecum, ascending colon, hepatic flexure, splenic flexure, duodenum, gall-bladder, and pylorus are sometimes responsible for varied gastro-intestinal symptoms.

Visceroptosis may be responsible for symptoms such as a dragging, pulling sensation in the abdomen, protrusion of the abdomen, and obstipation.

Spastic constipation and mucous colitis are fairly common conditions and call for *x*-ray examination and microscopic examination of the feces.

Giant colon (Hirschsprung's disease) is confirmed by *x*-ray examination.

Pathological signs, both objective and subjective, should be followed up (when possible) by special examination and suitable laboratory tests. Even in cases suffering from the various phobias, it is well to recommend appropriate tests, as negative findings in such instances are reassuring.

Symptoms suggestive of abnormalities of the esophagus should be investigated by *x*-ray, using both the fluoroscopic and radiographic methods after the ingestion of an opaque paste. When indicated, investigation should include:

1. Examination with esophagoscope.
2. Microscopic examination of tissue.
3. Blood Wassermann test.

Below are grouped a few common symptoms with a list of diagnostic measures and special tests indicated:

Indigestion, dyspepsia, epigastric pain, hematemesis:

Gastric analysis.
Gastro-intestinal *x*-ray, gall-bladder visualization.
Feces for blood.
Blood Wassermann test.
x-Ray of chest.
Blood-count.

Abdominal pain:

Gastro-intestinal *x*-ray (including gall-bladder).
x-Ray of colon and appendix (opaque enema).
x-Ray kidney, ureters, and bladder.
Blood Wassermann test.
Feces for blood, undigested food, azotorrhea, steatorrhea, parasites.
Feces screened for biliary calculi.
Urine for blood and bacteria.
Blood-count and hemoglobin estimation.

Nausea and vomiting:

Gastro-intestinal *x*-ray (including gall-bladder).
Blood Wassermann test.
Blood chemistry.
Urine for albumin, etc.
Blood-count.

Constipation, diarrhea:

Gastro-intestinal *x*-ray (including colon after opaque enema).
Blood-count and hemoglobin estimation.
Feces for blood and parasites.
Sigmoidoscopy and proctoscopy.

Melena:

Gastro-intestinal *x*-ray.
Sigmoidoscopy and proctoscopy.
x-Ray of colon after opaque enema.
Complete blood-count and hemoglobin estimation.
Feces for parasites and blood.

Jaundice:

Gastro-intestinal *x*-ray (including gall-bladder).
Complete blood-count.
Feces.
Urine for bile.
Liver function test.

Abdominal tumor:

Re-examination after thorough catharsis.
Gastro-intestinal *x*-ray (including gall-bladder).
Sigmoidoscopy and proctoscopy.
Blood Wassermann test.
Complete urinary *x*-ray.
Blood-count and hemoglobin estimation.

Splenomegaly:

Complete blood-count, hemoglobin estimation, and search for parasites.
Blood Wassermann test.

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Section 9

THE OSSEOUS SYSTEM

Introduction by R. Tait McKenzie, M. D.

The importance of noting and correcting faults of posture has been recognized much more widely in recent years following the discovery of their influences in displacing the thoracic and abdominal viscera and sometimes crippling them.

The presence of joint strain in the spine, at the pelvis, or in the foot arches is frequently due to faulty posture, and the wearing pain that results has a depressing influence on the general vitality of the individual. Close attention should then be paid to this aspect of the periodic health examination, and advice given and treatment urged in order to correct any marked deviation from the normal.

Examination of the Osseous System

Any routine periodic examination of the osseous system should be based on the ordinary rules for inspection, palpation, and, in certain instances, percussion and auscultation.

Inspection

Note the general appearance of the individual: whether tall, short, or medium height; fat, thin, or well nourished; young or old looking for age, or normal; complaint of any bone or joint trouble, with history of its onset, whether traumatic or possibly due to infection in some other part of the body.

With the individual stripped and standing, the body and extremities should be viewed in whole and in part from front, sides, and rear.

Inspection from the Front.—Note the relation of the posture to the vertical plane; whether the trunk sags to one side, whether one arm hangs free while the other is in contact with the body as seen in marked scoliosis; one shoulder higher than the

other; the pectoral muscles or ribs more prominent on one side than the other; umbilicus not in the midline; anterior superior spines not on the same level from faulty habitual standing posture, short leg, or lateral curvature of the spine.

Note whether the legs are straight, bowed, or knock-kneed.

Note any asymmetry in the two sides of the chest, contraction of the costal angle, transverse or horizontal grooves, or beading at the junction of the ribs and costal cartilages or depressed sternum (associated with adenoids, enlarged tonsils, chronic bronchitis, or cardiac lesions).

Note facial asymmetry (paralysis, osteomyelitis of the mandible, or wry-neck).

Note deviation of the head laterally or in rotation (associated with wry-neck, cervical scoliosis, spasmodic torticollis, defective vision, or strabismus).

Note relation of feet to the line of progression in standing and walking. Normally the great toes should be the same distance apart as the heels. Habitual outward rotation of the thigh at the hip-joint or an abnormal flattening of the forward curvature of the femoral neck will cause *toeing-out*, which is the *weak way to walk* and apt to lead to "weak-foot" or "flat-foot." It is called eversion. The reverse, or toeing-in or "pigeon-toe," is inversion. The parallel gait is the most efficient muscularly and less likely to lead to foot strain.

Note pronation, that is, if the inner malleolus is nearer the ground than normal; the inner border of the foot in this region bulging more than normal, thus throwing more weight than normal on the arch. *Pronation and eversion predispose to flat-foot.* Note supination, the reverse of pronation.

It should be borne in mind that the portion of the foot in front of the mediotarsal joint is normally adducted 25 to 35 degrees from the long axis of the os calcis. It is thus the arch is maintained. If less than this, we have valgus or flat-foot; if more, varus or club-foot.

Many individuals have morphologically or congenitally flat-feet, this being notably the case in the negro and Jewish races. The shape does not necessarily lead to symptoms and loss of function, which should alone determine the disability.

Note lowering of the anteroposterior arches. Note any flattening or lowering of the transverse arches in the region

of the distal ends of the second, third, and fourth metatarsals, especially if associated with metatarsalgia, the so-called Morton toe.

Note complaints of pain or points of tenderness on pressure at the scapho-astragaloid joints or sustentaculum tali, associated with flat-foot.

Fig. 21.—The inner border of the foot is normally concave. One of the earliest changes denoting weakening of the longitudinal arch is beginning convexity of the inner border. This change when present shows pronation of the foot.

Note hallux valgus or adduction of the great toe, bunion, and departure from alignment of the other phalanges from their metatarsals, usually caused by pointed-toe shoes or stockings that are too short. It should be borne in mind that the inner border of the foot should be straight or concave and

the outer border convex. The weight-bearing line of the leg should pass from the tibial tubercle down the shin through the center of the ankle-joint and forward through the third toe and not through the mediotarsal joint as seen in everted fly-footed or flat-footed individuals.

Note corns, hammer- or claw-toes, or abnormally high arches (usually feet with poor function). Hammer-toes may be para-

Fig. 22.—Palpating the anterior portion of the sole of the foot and noting callus which, if present, indicates weakening of the anterior transverse metatarsal arch.

lytic in origin, but, like corns, are often due to shoes or stockings that are too short.

Note callosities under ball of foot from deficient dorsal flexion, tight heel cord, equinus, or claw-foot.

Note tender spots under heels, painful heels from Neisserian infection, and the spurs seen in *x*-rays. Also look for osteophytes from the same cause, producing pain at the insertion of the tendo achillis.

In certain paralytic, rachitic, and club-foot cases there is rotation of the tibia on the femur, so that the shin is not under the center of the knee. It may be medial or lateral to it from relaxation of the ligaments at the knee-joint, with undue pull of the internal or external hamstrings.

Foot Function.—Grasp the heel of each foot in turn and see if there is the normal motion in the mediotarsal joints.

Grasp each ankle in turn and see if the foot can be moved the normal 135 degrees of plantar flexion and 70 degrees of dorsal flexion. High-heeled shoes may cause adaptive shortening of the tendo achillis.

Limp.—Have patient walk toward you and note any limp and whether of hip, knee, ankle, foot, or due to short leg. Notice whether limp, if present, is flaccid or spastic or due to relaxed or stiff joint, or to painful or rigid foot.

Inspection from the Sides.—The normal center of gravity of the body may be indicated by an imaginary line passing from the angle of the jaw just in front of the shoulder, lumbar spine, hip, knee- and ankle-joints. The chest should touch any vertical "posture line," such as a door edge, but the nose, abdomen, and toes should just avoid touching it if the posture is correct. The normal spine curves slightly forward in the cervical region, rather more backward in the dorsal region, and again slightly forward in the lumbar region. An abnormally flat back has no pathological significance.

Note departures from normal posture or contour:

(1) Forward thrusting neck ("debutante slouch").
(2) Round shoulders (kyphosis).
(3) Sharp angular backward curvature (spondylitis, Pott's disease, rickets—dorsolumbar).
(4) Sway back (lordosis).
(5) Pendulous, forward thrusting abdomen, abdominal relaxation.
(6) Back-knee, relaxed knee, genu recurvatum (congenital or paralytic).

Malpostures in the cervical and upper thoracic regions depress the sternum and afford less room for heart and lung function; forward sagging shoulders hamper full lung expansion. Depressed sternum, general body stooping, and relaxed abdominal muscles predispose to gastroptosis, enteroptosis, float-

ing kidneys, constipation, auto-intoxication, indigestion, and nervous dyspepsia. Note relation of malposture to symptom complained of.

Knee Function.—Note the range of motion of each knee, which should be from full extension to 135 degrees flexion. There should be no lateral mobility or noticeable rotation of the tibiæ on the femora.

Fig. 23.—Inspecting and palpating the spine.

Hip Function.—Note the range of motion of the hip from full extension to about the normal 110 degrees flexion with the body, depending to some extent on the stoutness of the individual. The extended thigh and leg can be *ab*ducted about 45 to 60 degrees and *ad*ducted 30 to 45 degrees.

Inspection from the Back.—Note the vertical line of the spine or the deviation to the right or left or to both sides.

Note the level of the shoulders, the crest of the ilia, and the position of the scapulæ with relation to the spine: "winged scapulæ"; forward sagging scapulæ; one scapula abducted and elevated, the other close to the spine and on a lower level, as in marked scoliosis. Note the contour of the sides of the thorax and rotation of the spine in lateral curvature. Note thoracic depressions following empyema, atelectasis, or paralysis with muscle atrophy. Note position of posterosuperior spines, gluteal fold, and crease of buttocks. Note any evidence of undue lordosis.

Spinal Function.—Have subject flex, extend, and rotate head to test cervical flexibility. With examiner's hands in the axillæ test thoracic flexibility by raising shoulders and side bendings. Test lumbar flexibility by having subject side bend to each side to the limit. Also rotate the thorax on the pelvis. Test forward flexibility of whole spine by having patient endeavor to touch the floor with both hands without bending the knees.

Shoulder Function.—Test power to extend the arms upward, forward, outward, and in circumduction.

Elbow, Wrist, and Finger Function.—Test ability to fully flex and extend these joints, to pronate and supinate the forearm, adduct and abduct the wrist, and separate and approximate the fingers and thumb.

Palpation

Palpate for character of any abnormal swelling or mass, whether hard or soft, movable or adherent; contraction, atony, or atrophy of muscles; crepitation, crackling or clicking of joints, and bony or cartilaginous blocking of joint motion; "locking" of the knee associated with history of attacks of "water on the knee," as suggestive of loose or torn semilunar cartilage.

Percussion

Percuss any swelling or mass to determine whether liquid, solid, doughy, or gelatinous. Percussion of the patella in synovitis of the knee will reveal the so-called "floating patella."

Low Spinal, Sciatic, or Sacro-iliac Pain

One of the commonest complaints is sprain in the sacro-iliac region. Usually this is due to heavy lifting or a fall. It may be a postoperative complaint. The pain usually radiates down the distribution of the sciatic nerve and is frequently called sciatica, sciatic neuralgia, neuritis, etc.

When the ligaments of the sacro-iliac joint are torn there is abnormal motion between the sacrum and ilium. The sharp edge of one or the other impinges on the sciatic nerve after it emerges from the spinal cord through the sacral foramina. Therefore, any movement of either bone on the other intensifies this pain. As the hamstring tendons are attached to the tuberosity of the ischium, when they are put on the stretch the ilium, in turn, is moved on the sacrum and pain results. Consequently, aside from limitation of motion, the bearing of the weight on the non-affected side, and abduction of the affected leg, the most rational test is the so-called Goldthwaite sign. This consists of having the subject supine and flexing the leg, fully extended at the knee, on the body. If sacro-iliac sprain or subluxation, as it is sometimes spoken of, is present, the pain will be intensified when the leg is flexed 30 to 60 degrees or less, and muscle spasm will often prevent movement beyond the point where pain is produced. This limitation of motion must not be confused with that seen in tuberculous hip disease, where in the acute stage all motions, not only flexion, are limited and the pain is referred to the inner front side of the knee.

In suspected sacro-iliac strain such procedures as pushing, pressing, or shoving on the back or sides of the pelvis or hammering on the heel with the hand are unscientific and negligible in diagnostic value. The *x*-ray findings in many of these cases are negative in value, showing only a gaping pseudo-arthrosis, which may be seen in those without symptoms. If of long duration osteo-arthritic exostoses may be revealed as focal infections from disease in tooth, tonsil, etc.

Loss of function in a part should lead us to note the cause, whether—

1. Paralytic, cerebral, spinal, or peripheral (apoplexy, spastic paraplegia, tabes, anterior poliomyelitis, punctured

wound, or fracture). Contracture of muscles whose antagonists are paretic.

2. Muscular inflammation, scars, burns, myalgias, myositis, lumbago, etc.

3. Periarticular inflammations, acute or chronic, bursitis, tenosynovitis, gout, rheumatoid arthritis, osteo-arthritis.

4. Articular fracture, tuberculosis, syphilis, gonorrheal arthritis, infectious arthritis.

Supplementary Investigations

Evidence of *focal infection, myositis, periarticular* or *articular involvement* may call for:

x-Ray of teeth.

x-Ray of sinuses.

Tonsil examination and culture.

Blood Wassermann test.

Gonococcus fixation.

x-Ray of bone or joint involved (both anteroposterior and lateral, and the opposite side for comparison).

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Section 10

THE NERVOUS SYSTEM

Introduction by Louis Casamajor, M. D.

Although it is admitted as a truism that every general physical examination should include examination of the nervous system, it is all too rarely practised. The nervous system is a general bodily system—a characteristic which it shares only with the cardiovascular system. Hence one expects to find, and looks for, nervous system symptoms and signs exceedingly wide-spread.

Methods of examination in nervous system diseases as practised today are simply methods of the study of normal and abnormal physiology of that part of the nervous system under examination. Probably there is no part of diagnosis today that utilizes to greater extent a knowledge of physiology and microscopic anatomy than does neurology. Neurological signs are not signs of disease, but signs of disturbed physiology and of anatomical defect. Knowledge of disease pictures is evolved from combination of signs plus clinical course.

When one realizes these points it is remarkable that it is not trite to insist that a complete neurological examination is as essential as any other. Probably no great system of the body receives such short shrift as does the nervous system in routine examinations, and it is not because neurological examination is intricate and difficult or requires elaborate instruments. A percussion hammer, a flashlight, a piece of cotton, a pin, and a couple of test-tubes are all that are needed for a careful routine examination.

Most neurological diseases are of very gradual onset and are diagnosable early almost as easily as late, and little is of more importance to the patient and the physician than this early diagnosis in view of prognosis. An early diagnosis of general paresis, before striking mental signs develop, is often

indicated by neurological examination, and well repays the physician for the little bother it entails. Surely its importance is so great as to make any bother seem trivial. The same may be said, with probably greater truth, of tabes dorsalis, multiple sclerosis, combined sclerosis, and spinal cord and brain neoplasms. The modern feeling is that all of these now are first diagnosed too late. It is not the neurologist, but the general practitioner and the health examination diagnosticians who must make these early diagnoses in the future.

The plea for complete neurological examination should not fall on deaf ears. It is not sufficient to test a subject's pupillary light reactions by light from a window and to tap his patellar tendons while he is sitting cross-legged in a chair. When one thinks of diagnoses from the point of view of physiology, such a procedure becomes not only inadequate, but puerile. At best one can thus learn but two, possibly unrelated, physiological facts and cannot hope to arrive at a diagnosis.

As the years go on one sees fewer and fewer individuals with gastric crises subjected to exploratory laparotomy. Complete neurological examination should reduce the number to zero. Not all tabetics have Argyll-Robertson pupils, nor are the knee-jerks always absent in early cases. Frequently the ankle-jerks are lost before those of the knee are much affected, and sensory examination frequently shows loss of position sense in the feet as a very early sign.

These are but details in a plea for more careful neurological examination as a part of routine health examinations. There are other reflexes besides the knee-jerks and other functions of the nervous system besides the motor. Practically all of these functions can be reached for diagnostic study, and unless one reaches them all, neurological examination has not been done and a most important system of the body has been neglected.

Examination of the Nervous System

The examination of the nervous system should be preceded by a systematic history following the plan of a general medical history, but emphasizing certain aspects. A convenient form is the following:

History

1. Chief complaint. Other complaints.

2. Present illness. Date; mode of onset and general course, with an account of alleviating and aggravating factors and the nature and results of former treatment.

3. Birth and developmental history, emphasizing trauma, presence of stigmata, age at which patient walked and talked, school career, and general intellectual and emotional development.

4. Previous illnesses, especially convulsions, paralysis, encephalitis, meningitis, and syphilis.

5. Personal history. Extent to which the following are used: Tea, coffee, tobacco, alcohol, drugs. Type of occupation, with amount of nerve strain involved. Sexual history. Menstrual history.

6. Family history. Especially mental defect, epilepsy, psychosis, psychoneurosis, migraine, chorea, Friedreich's disease, Marie's cerebellar ataxia, progressive muscular atrophy, and syphilis. History of pregnancies with their sequelæ.

Physical Examination

The general examination of the nervous system should cover the following observations:

1. Abnormal development or asymmetries ("stigmata"), deformity or tenderness of the spine.

2. Abnormal development of the long bones and skull (especially the changes of gigantism or acromegaly, which may indicate an intracranial tumor).

3. Excessive or asymmetrical perspiration, localized changes in temperature, cyanosis, or ischemia.

4. Local vascular changes, which may indicate an angioneurosis, an old lesion in the peripheral nerves, cord, or brain, or a beginning disseminated sclerosis.

5. Any enlargement of the peripheral nerves.

6. Trophic changes, especially of the nails, hair, and feet. (Trophic ulcers of the feet suggest especially tabes, syringomyelia, spina bifida, and leprous neuritis.)

7. The abnormally high arch of the foot known as pes cavus (suggestive of Friedreich's ataxia, but also occurring in progressive hypertrophic neuritis, following cellulitis of the calf, etc.)

8. Unusual attitudes and involuntary movements (twitchings, spasms, tics, convulsions, tremors, athetoid movements, choreiform movements).

Tremors

Note the muscles involved, the rate and amplitude of vibration, the regularity, and whether more marked during rest, motion, emotional tension, or distraction of attention. A fine rapid tremor of the extended fingers suggests a functional or toxic condition. Coarse, slow tremors are more suggestive of organic disease. Tremors of the facial muscles and coarse tremor of the tongue are suggestive of general paresis. Intention tremors (increased by voluntary movement) usually indicate a lesion of the cerebellum or cerebellar peduncles or red nucleus. Multiple sclerosis, encephalitis, and intracranial tumors should be especially considered, also lesions of the lenticular nucleus. Coarse tremors diminished by voluntary motion suggest senile changes and the Parkinson syndrome, whether a true paralysis agitans or a sequel of encephalitis.

Athetoid movements usually indicate a lesion of the corpus striatum.

Choreiform movements may indicate the common "rheumatic chorea" or the hereditary Huntington's chorea. If the latter is suspected, mental deterioration should be looked for. Choreiform movements often occur in hysteria, but usually have a distinctly purposive character as opposed to the random jerks of true chorea.

Gait

Observe the subject's manner of entering the room. Look for dragging of limb, spasticity, staggering, clumsiness, ataxia, or festination. Note presence of foot-drop. Test ability to stand on toes and heels and to walk a line. If there is any possibility of a disturbance of gait, apply Fournier's tests, which serve to bring out a latent ataxia. They consist of:

1. Abruptly rising from sitting posture and walking.
2. Stopping walking abruptly on command.
3. Turning abruptly on command while walking.

Note loss of normal associated movements of the arms while walking. This may be the only sign of disease of the basal

ganglia such as occurs in Parkinson's disease or as a sequel of encephalitis.

Co-ordination

Any ataxia revealed by the following tests indicates an interruption in the pathway conducting the muscle-joint-tendon sense:

1. Have the subject stand with heels and toes of both feet touching, and the eyes first open and then closed. Greater unsteadiness when the eyes are closed is the positive response (Romberg test).

2. Have the subject touch the tip of the nose with one finger of each hand alternately, the eyes closed and the arm held in abduction at the level of the shoulders. (Note ataxia or intention tremor.)

3. Have the subject, from a similar position, approximate the tips of the index-fingers with eyes closed.

4. Have the subject recumbent and eyes closed, place one heel exactly on the patella, and slide heel down shin. Test both sides.

It is important to remember that a peripheral neuritis may produce ataxia. The most frequent causes are tabes, multiple neuritis, combined sclerosis (with or without pernicious anemia), lesions of the posterior columns resulting from arteriosclerosis, Friedreich's disease, disease of the cerebellum, lesions of the bulb, cord tumors, and hysteria. Ataxia may occur in multiple sclerosis or following the spinal form of epidemic encephalitis.

Forms of inco-ordination present in cerebellar disease are (1) *dysmetria* and (2) *adiadokocinesis*. Test for dysmetria by having the subject reach for an object; observe over- or under-reaching. Test for adiadokocinesis by rapid alternate supination or pronation of forearms. Another form of inco-ordination is a decomposition of the synergic unit. This may be brought out, for example, by having the recumbent subject attempt to approximate the heel to the buttock. Normally the flexion at the thigh and knee will occur synchronously, but in cerebellar disease these flexions are often carried out separately and in succession.

Test for past-pointing. Definite past-pointing indicates disease of the cerebellum or vestibular mechanism. With the

subject seated, eyes closed, and arm extended in front of him, index-finger resting on finger of examiner, let him elevate the arm at the shoulder until the hand is raised about 2 feet, and then attempt to touch examiner's finger again. If he misses appreciably, do not let him see how much or in what direction he missed, but test repeatedly to see if he deviates consistently in one direction. Test both arms.

Performance of Skilled Acts

Apraxia and Agraphia.—Test the subject's ability to perform simple manipulations, such as grasping articles, buttoning coat, tying shoe-laces, handwriting. Loss of ability, or apraxia in the absence of actual paralysis, is the result of a cerebral lesion usually involving the corpus callosum or callosal pathways. Agraphia is a special case. The existence of a separate writing center is disputed.

Dysarthria.—This may be due to a lesion in the cortex or anywhere in the motor path. Note spontaneous speech and test for dysarthria by having the subject repeat certain phrases, such as "Methodist Episcopal" and "Third Riding Artillery Brigade." Watch especially for:

1. The slurring speech of general paresis (similar to that of acute alcoholism)—fibrillary twitchings of muscles of tongue, lips, and face are common.
2. Slow, monotonous speech of striate lesions, whether postencephalitic or parkinsonian.
3. Scanning speech of multiple sclerosis.
4. Explosive speech of cerebellar disease.
5. "Hot potato" speech of Friedreich's ataxia.
6. Very indistinct speech of bulbar palsy.

Aphasia.—This indicates a cortical or subcortical lesion. The presence of true aphasia is sought by observing whether the subject can talk spontaneously, recognize and name familiar objects, understand and repeat spoken and written words, or copy writing.

Reflexes: Deep (Tendon)

In testing all tendon reflexes, be sure to strike the tendon, and not the muscle, and to have the part as relaxed and well supported as possible.

The following reflexes should be tested:

1. Jaw.
2. Pectoral.
3. Biceps.
4. Triceps.
5. Wrists.
6. Radial.
7. Ulnar.
8. Patellar.
9. Suprapatellar.
10. Achilles.
11. Periosteal.

In eliciting the patellar reflex the subject should be seated on the edge of the examining table with the legs hanging freely.

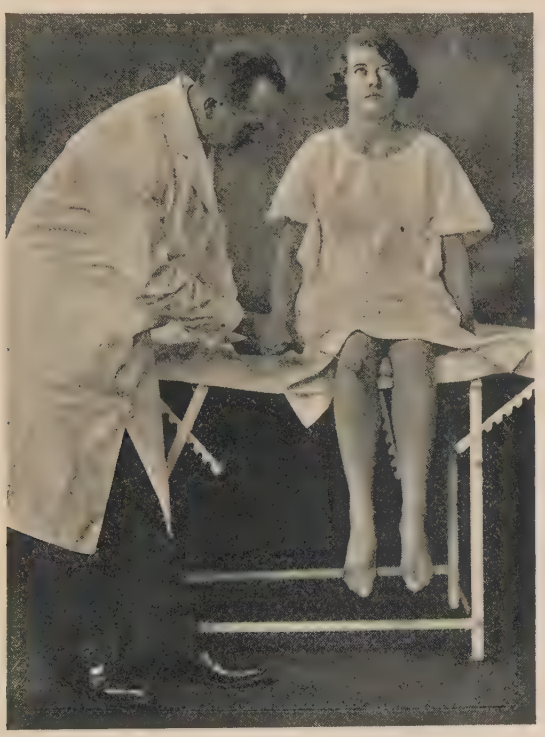

Fig. 24.—Testing the patellar reflexes. In order to prevent the subject from anticipating the blow, the gaze should be diverted from the percussion hammer.

With the subject in the same position elicit the Achilles reflexes, exerting slight pressure upward on the ball of the foot with one hand while percussing the tendon. If the response is doubtful, test again with the subject kneeling on a chair (fac-

ing the back of the chair). If a reflex is apparently absent, have the subject attempt to pull apart his tightly interlocked hands on a signal given by the examiner simultaneously with striking the tendon (Jendrassik method of reinforcement). A pendular response often accompanies cerebellar disease.

Reflexes: Superficial (Cutaneous)

1. *Ciliospinal.*—Dilatation of pupil on scratching, pricking, or pinching the corresponding side of the neck over the course of the common carotids. Frequently absent. Loss of this reflex occurs early in tabes. Absence of this reflex may be due to (1) lesion in the course of the impulses mediated by the cervical sympathetic, (2) syringomyelia, or (3) cervical rib.

2. *Abdominal.*—Absence due to lesion of the pyramidal tract above level of sixth thoracic segment—cerebral lesion, multiple sclerosis, or encephalitis—or to obesity, flabby musculature, or state of exhaustion. Test by stroking skin in the supra-umbilical, suprapubic, and upper and lower lateral areas. (The instrument used should not be too sharp—the end of a wooden throat applicator is satisfactory.)

3. *Cremasteric.*—Has much the same significance as the abdominal. Test by stroking or pinching the skin of the upper, inner thigh.

4. *Plantar.*—Present only when upper neuron pathway is intact. Test by stroking sole of foot (especially the inner side) gently with a medium blunt instrument.

5. *Babinski.*—Dorsiflexion of the great toe due to interruption of upper neuron pathway. Test by stroking the outer sole of the foot, knee and hip being at the same time semiflexed and rotated outward. If the foot is cold, the reflex may not be obtained; and it cannot be obtained if dorsiflexion is prevented by ankylosis or tendon contracture. There is usually a fanning of the toes. The Babinski response (except in infants too young to walk) nearly always indicates an upper motor neuron lesion. A pseudo-Babinski, which is really an athetoid toe movement, may be present in lesions of the corpus striatum.

6. *Ankle-clonus.*—This indicates irritation of the pyramidal tract above the lower neuron. In genuine clonus the rhythmic contractions of the soleus are regular and well sustained. Ankle-clonus should be tested with the subject recumbent.

The examiner places one hand beneath the subject's knee and semiflexes hip and knee, and with the other hand he suddenly dorsiflexes the ankle by pressure on the ball of the foot.

Absence of the deep reflexes should especially suggest the following disturbances:

1. Tabes dorsalis.
2. Neuritis.
3. Paresis.
4. Poliomyelitis.
5. Uremia.
6. Recent complete lesion of the cord.
7. Progressive muscular atrophy.
8. Syringomyelia.
9. Amyotrophic lateral sclerosis.
10. Postepileptic states.

An increase of the deep reflexes should especially suggest:

1. Functional disease.
2. Neurosyphilis.
3. Multiple sclerosis.
4. Encephalitis and post-encephalitic states.
5. Cerebral hemorrhage.
6. Thrombosis.
7. Tumor, abscess, etc.
8. Pressure on the cord.
9. Toxic states (alcoholism, infections, uremia, etc.).
10. Meningitis, acute or chronic.

7. *Muscle Status.*—Test the strength of the muscles systematically and note any atrophy. If atrophy is suspected, corresponding parts should be measured. Look for atrophy of the intrinsic muscles of the hands. Look for spasticity or diminution in tone. Spasticity is usually present in lesions of the upper motor neuron except when of very recent origin, while hypotonia occurs in lesions of the lower motor neuron, dorsal columns, and cerebellum.

Muscular atrophy or flaccidity may be due to primary diseases of the muscles. A study of the electrical reactions may be necessary to determine whether the cause is in the nervous system or in the muscles. Fibrillary twitchings occur in anemia, neurasthenia, and in lesions causing slow degeneration of the lower motor neuron cell bodies. Muscular rigidity may indicate a lesion of the corpus striatum.

Abnormal Associated Movements

Only a few of these movements need be sought: (*a*) Thumb sign of Klippel Weil, adduction of the thumb when the flexed

fingers are extended by the examiner; (*b*) Hoffman's sign, a similar movement of the thumb when the nails of the subject's fingers are snapped by the nails of the examiner—positive responses indicating a lesion of the upper motor neuron; (*c*) trunk-thigh sign of Babinski, greater elevation of the paretic leg on sitting up from prone position with arms crossed on chest.

Meningeal System

With the subject recumbent test for rigidity of the posterior neck muscles by attempting passive flexion of the neck. Brudzinski's sign consists in spontaneous flexion of the hips and knees when the neck is passively flexed. Kernig's sign consists in a contraction of the hamstring muscles with pain when the hip is flexed at a right angle and the knee extended. These signs when positive indicate meningeal irritation. The tache cérébrale may be present, but is of no special diagnostic importance.

Electrical Reactions

These tests require special apparatus and training and will not be considered here.

Nerve Hyperexcitability (Tetany)

This condition is indicated by (1) Chvostek's sign, sudden spasm on tapping one side of the face, and (2) Trousseau's sign, a muscular spasm induced by restriction of local blood-supply.

SENSORY EXAMINATION

The surface of the body should be systematically examined for abnormalities in the perception of *light touch, pain, and temperature differences.*

In testing the perception of *touch* a piece of cotton or fine brush should be used. Areas of abnormal response should be mapped out. Test the vibratory sense by applying a low-pitched tuning-fork (below middle C) to the tibiæ, ankles, and distal phalanges of the great toes. If there is any question of a cortical lesion, test ability to accurately localize the touch. Stereognosis should be tested by placing familiar objects in the hand of the subject and having him identify them without looking at them. Test ability to identify by touch various

materials, such as cloth, writing paper, blotting paper, and wooden tongue depressor. This ability is often lost in cortical lesions.

In testing *pain* perception use a sharp point, the subject attempting to distinguish between touch and actual pain. It is also well to touch the skin with a blunt point, the subject stating each time whether the point is sharp or dull. (It is difficult to determine any absolute variation in this sense without an esthesiometer.)

Test the *thermal* sense by asking the subject to distinguish between tubes or bottles filled with hot and cold water.

Test the *joint sense.* The most important joints to test are those of the toes and fingers. Hold the joint stationary after various passive movements, asking the subject to imitate, without looking, the exact position with the opposite corresponding member. The muscles must be entirely relaxed to avoid the use of the kinesthetic sense. Since this latter sense is also mediated by the posterior columns of the cord it is affected together with the joint sense in posterior column lesions, and this differentiation is not important except in cortical lesions, when the kinesthetic sense alone may be lost.

The *corneal reflex* should be elicited by touching the cornea—not merely the scleral conjunctiva—with a firmly twisted piece of cotton or a wisp of paper. The head of a pin is never satisfactory, nor is the finger. The normal reflex is a winking of *both* eyes. Its absence is usually noted as corneal anesthesia, but it may be due to a lesion in the efferent tract, the facial nerve. If neither eyelid responds when the cornea on one side is stimulated, an interruption in the sensory pathway is indicated, the ophthalmic division of the trigeminal. If only the eye stimulated responds, the lesion is probably in the efferent portion of the arc.

The pharyngeal reflex may likewise be abolished from a lesion in either portion of the arc. It should be elicited by stroking the posterior pharyngeal wall with a swab and noting movement of the wall or tendency to gag or cough.

Abolition of the corneal and pharyngeal reflexes is suggestive of hysteria, but may be the result of an organic lesion.

Sensory Changes.—These changes not corresponding to peripheral nerve or root distribution are usually the result of hyste-

ria, but loss of tactile and pain sense should also suggest tabes, peripheral neuritis, combined sclerosis, or lesions of the sensory pathway anywhere in its course. Central subcortical lesions usually produce a hemianesthesia. Anesthesia of cortical origin is more likely to be mixed with motor symptoms, affects especially the discriminative qualities, is not usually so extensive, and is associated with inconsistency of response. Hysterical anesthesia is usually more complete and terminates more sharply at the midline than is the case with organic conditions.

Increased sensibility or hyperesthesia should suggest hysteria, tabes, neuritis, multiple sclerosis, neuralgia, pressure on the posterior spinal roots, and a lesion of the thalamus.

Paresthesia or perverted sensation has much the same significance as hyperesthesia, but may also occur when an injured nerve is regenerating.

Loss of the muscle-joint sense without the loss of the others is characteristic of tabes and Friedreich's ataxia.

Loss of pain and temperature with preservation of touch and muscle-joint sense constitutes the sensory dissociation characteristic of syringomyelia.

Cranial Nerves

First, or Olfactory Nerve.—Inquire for subjective odors which are suggestive of cerebral tumors, disease of nose or sinuses, and hysteria.

Test objective sensibility by the use of aromatic substances, such as oil of cloves, peppermint, or turpentine. Anosmia or loss of sense of smell should suggest especially, in the absence of nasal obstruction, lesions of the bulb or olfactory tract, frontal tumor, or tabes.

Second, or Optic Nerve.—Visual acuity should be tested by standard methods, and the cause of any defect determined. Optic atrophy may be present without evident loss of acuity. The size of the visual field should be determined with considerable care. Usually it is sufficient to compare it with the examiner's own fields. The subject and examiner should be seated facing each other, their faces 3 feet apart. To test the right eye the subject covers his left with his hand (while the examiner covers his right and looks constantly at subject's right eye).

The subject is directed to look constantly at the pupil of the examiner's left eye. From the periphery the examiner moves his hand toward the center of the field, slightly waving his fingers, and the subject signifies the moment at which he perceives them. Test all four quadrants in this way. It is important that the physician's hand should be constantly midway between subject and himself and that the subject's eye should not be deviated. If there is any question of abnormality, more accurate methods should be employed by someone specially trained in perimetry. If a perimeter is used, the fields should also be mapped for blue, red, and green. The examiner should look for scotomata, concentric narrowing of the fields, irregular narrowing, hemianopsia, and quadrantic hemianopsia. (The significance of abnormalities of the fields is too complicated to discuss here. Standards works on neurology or ophthalmology should be consulted.) It should be remembered that hemianopsia and concentric narrowing of the fields may occur in hysteria, but usually indicate an organic lesion of the optic tract. Disease of the eye itself should be excluded by an ophthalmologist.

The eye-grounds should be examined with the ophthalmoscope to determine especially the presence of optic atrophy, optic neuritis, edema and bulging of the optic disk, and retinal hemorrhages. Optic neuritis should suggest especially intracranial tumors and meningitis; but systemic diseases must be excluded. Optic atrophy should suggest especially neurosyphilis, multiple sclerosis, or a postneuritic process. Bitemporal pallor is often an early sign of multiple sclerosis.

Third, or Oculomotor Nerve.—Pupil: The constrictor fibers of the iris are supplied by the third nerve and the dilator fibers by the cervical sympathetic, so that the condition of the pupil is largely a resultant of these opposing forces.

The pupils should be examined in a medium light with the eyes directed straight ahead, since in deviation the abducted pupil will be larger than the adducted one. Note abnormal mydriasis or myosis, irregularity, eccentricity, and inequality. If unequal, test again after the eyes have been exposed to uniform illumination for several minutes. Marked inequality should suggest organic disease, especially irritating lesions of the cervical sympathetic and neurosyphilis. Diseases of the eye itself must be excluded. Irregularity should suggest neuro-

syphilis. Abnormal myosis should suggest tabes and pontine hemorrhage (eye diseases excluded).

Test the reaction to light by flashing a bright light into the eyes while they are steadily fixed on a fairly distant object. The surrounding illumination should be dim. A dim flashlight is not a sufficient stimulus. Note the direct and consensual reaction. Note quickness of response and range of contraction.

Next test the accommodation reflex. Hold a small object or the tip of the finger 6 inches in front of the face, between the eyes and on a level with them. Have the subject look across the room straight ahead at some definite object and then quickly focus on the near object. The distant and near objects should be equally illuminated to avoid a coincident light stimulus. Loss of the light reflex with preservation of accommodation is the classical Argyll-Robertson phenomenon and usually indicates tabes, general paresis, or other forms of neurosyphilis. It may occur in alcoholism and syringomyelia. Sluggish response to light should be suggestive of neurosyphilis. Completely rigid pupils are more suggestive of disease of the eye itself. Loss of the accommodation reflex and preservation of the light reflex occurs after diphtheria.

Third, Fourth (Trochlear), and Sixth (Abducens) Nerves.—Test the movements of the eye in all directions. Note ptosis of the lid, failure to move in any direction, and weakness of convergence. Note diplopia. Note any inco-ordination. Any paralysis that is not congenital is strongly suggestive of an intracranial lesion, especially tumor, meningitis, syphilis, and encephalitis. Weakness of convergence is frequently found following encephalitis. A history of diplopia should suggest encephalitis, multiple sclerosis, or syphilis.

Fifth, or Trigeminal Nerve.—Test the motor component by having the subject firmly close the jaws while the masseters and pterygoids are palpated. Have the subject protrude the lower jaw and also move it from side to side. Test the sensory components for tactile and pain perception. The ophthalmic division supplies the cornea. If the subject complains of subjective pain, note whether the painful area corresponds to the distribution of one or more branches. If the pain is severe enough to suggest a major neuralgia, note whether a paroxysm

is produced by movements of the tongue or changes of temperature. Be sure the pain is not localized in the masseter muscle. The fifth nerve is frequently involved in lesions of the medulla.

The course of the taste fibers from the anterior two-thirds of the tongue is disputed, which makes it impossible to discuss the function of taste exclusively in relation to the seventh and ninth nerves.

Seventh, or Facial Nerve.—This is a motor nerve (for all practical purposes) except for its part in mediating taste from the anterior two-thirds of the tongue. Note flattening of one side of the face, sagging of the eyebrow and lower lid, or retraction of mouth toward one side. Have subject whistle, show teeth by abducting angles of the mouth, close eyes, raise and lower brows. The upper third of the face is not completely paralyzed except by nuclear or infranuclear lesions. Complete paralysis of one side with inability to close the eye is usually due to Bell's palsy. In such a case the site of the lesion may often be accurately located by noting whether taste on the anterior two-thirds of the tongue is involved and whether there is hyperacusis in the corresponding ear.

Bell's palsy may be due to exposure or a toxic focus or may be due to a more serious lesion, such as a tumor, gumma, or meningeal process. (Do not confuse Bell's palsy with progressive hemiatrophy of the face, in which all the tissues are atrophied.)

The sense of taste should be tested by such substances as sugar, salt, quinin, and vinegar, or, better, citric acid—dry powders are best.

Note facial rigidity or lack of expression which occurs in lesions of the corpus striatum.

The seventh nerve is frequently affected in lesions of the medulla.

Eighth, or Auditory Nerve.—The auditory portion should be tested by the methods described in the section on the ear. A hearing defect not due to disease of the middle ear suggests an intracranial lesion. The frequency and accessibility to operation of tumors of the cerebellopontine angle should be constantly borne in mind. These tumors usually produce auditory and vestibular disturbances, together with symptoms due to

the pressure on the fifth, sixth, seventh, ninth, and tenth nerves.

Test the vestibular mechanism by the Bárány rotatory and caloric tests, and by looking for unprovoked nystagmus. The Bárány tests are too complicated to describe here. In searching for nystagmus the subject's eyes should be directed to all four quadrants. Slight "nystagmoid" movements on extreme deviation are not pathological. If nystagmus is present, its extent and rate should be noted, the direction of the slow and rapid movements, and the position of the eyeball in which the nystagmus is most marked. Nystagmus occurs in lesions of the labyrinth, midbrain, pons, and cerebellum. If a subject complains of dizziness, make sure whether there is a true vertigo or merely a general sensation of unsteadiness, blurring, or "swimming before the eyes." The presence of true vertigo has the same significance as nystagmus and the two are generally associated. Ménierè's syndrome should always indicate a most careful exclusion of other intracerebral disease before the lesion is definitely located in the labyrinth.

Ninth, or Glossopharyngeal Nerve.—Lesions of this nerve result in loss of taste and common sensation from the posterior third of the tongue, difficulty in swallowing, and visible "curtain" movement of the posterior wall of the pharynx upon sensory stimulation. Isolated paralysis of this nerve is practically unheard of. It is important to remember if the soft palate is drawn to one side when the patient says "ah," the lesion is in the vagus.

Tenth, or Vagus Nerve.—The distribution of this nerve is too extensive to describe. Paralysis of the muscles of the soft palate and larynx are the most important neurological results of lesions of the vagus. Cardiorespiratory disturbances do not occur unless the lesion is bilateral. Gastric symptoms may occur in unilateral lesions. In paralyses of the larynx aneurysm and hysteria must be excluded.

Eleventh, or Spinal Accessory Nerve.—Lesions of this nerve produce paralysis of the sternomastoid and upper portion of the trapezius.

Twelfth, or Hypoglossal Nerve.—Lesions of this nerve produce paralysis of the corresponding half of the tongue, with deviation toward the paralyzed side in a characteristic curve.

If of long standing, atrophy is evident. The nuclei of this nerve lie so close together in the bulb that the symptoms are often bilateral.

Supplementary Investigations

Cases suggesting epilepsy should probably be included in the group indicating a psychiatric examination. These cases should also have a complete neurological work-up.

With rare exceptions an examination of the spinal fluid should not be recommended except after a careful neurological examination. Clear-cut cases of syphilis are exceptions; also acute febrile conditions in which bacterial infection of the central nervous system is probable (meningitis, poliomyelitis, etc.).

It is essential to remember that a negative blood Wassermann never proves that the spinal fluid Wassermann will also be negative.

The additional special tests and diagnostic measures listed below are indicated:

Blood Wassermann test:

Inequality, irregularity, or sluggishness of the pupils.
Sluggish, exaggerated, or unequal knee-jerks.
Lesions of any cranial nerve.
Any of the symptoms of general paresis, especially tremor of tongue and facial muscles, speech defect, memory defect, personality changes, definite Romberg.
Disturbances of rectal and vesical control, lightning pains, paresthesias, pains suggesting gastric crises, disturbance of gait, ataxia, or any symptom or sign of tabes.
Convulsions, psychoses, mental defect, or whenever the symptoms remain obscure and unexplained.
As an extreme precaution in any disease of the central nervous system.

x-Ray of the skull:

Whenever there is any suspicion of brain abscess or tumor, fracture or tumor of the skull, or acromegaly.

x-Ray of the spine:

Whenever there is suspicion of pressure on the cord or nerve roots.

Complete blood-count:

When there is evidence of a combined sclerosis, plumbism, or vertigo.

Study of the electrical reactions:

May be necessary to distinguish between functional and organic disease, between upper and lower motor neuron lesions, between disease of the nervous system and disease of the muscles; or, to determine the exact location and extent of a peripheral nerve lesion.

Search for foci of infection:

In all cases of neuritis or neuralgia. (The rôle of focal infections in the functional neuroses and psychoses is still disputed, but a careful search should be made in these cases.)

Psychiatric Examination

In conducting a psychiatric examination one cannot adhere to a rigid form except in the case of a frank psychosis or mental defect. The main object should be to win the subject's confidence and induce him to talk about his life with complete frankness. Even when one believes he is being quite honest, he is often unconsciously protecting his pride and dignity by a variety of defense mechanisms. In a single interview it is obviously impossible to divine the whole truth, and still more impossible to give the subject complete insight into his own self-deception. However, every effort should be made to approximate these ends, and it is often surprising how much can be accomplished in a short time after the subject has been allowed to tell his story in his own way. If a set form is followed, the psychiatrist will obtain a series of answers to formal questions, but will not know the subject.

Once contact with the individual has been established and the general nature of his difficulties has been revealed, the physician should direct his inquiries so as to gain as much information as possible about the genesis of the disorder. It is important throughout the examination to be constantly seeking to answer the questions, To what situation is the subject reacting inadequately, non-adjustively, and indirectly? What major instincts are being constantly thwarted? Most nervous symptoms of a functional nature result from a failure to meet

rationally one or more external situations. It is true that in some individuals the disorder does not result from an external difficulty, but from an internal one, in which case only very prolonged search will ascertain the cause. The majority of functional disturbances, however, are due to external difficulties.

In questioning the subject the following points should be covered (it is assumed that a medical history has previously been taken):

1. Family history: History of nervous or mental disease and account of general personality of parents.

2. Home environment: Number of brothers and sisters and their attitude toward the subject. Did he feel inferior to them in any way, and, if so, how did he compensate? Was he dominated or excessively repressed by any member of his family? What member of his family exerted the greatest influence over him and what was its nature and effect? Was he contented, obedient, unhappy, rebellious? Did he feel unwanted by his parents?

3. Pre-adolescent development: Age of walking and talking. History of night terrors, tantrums, prolonged bed-wetting, masturbation or other sex activity, delinquency. Attitude toward other children. History of mental trauma.

4. Adolescence: Relationship to parents. Extent to which infantile attitude toward the world is replaced by an independent adult attitude. Sexual inclinations and experiences. How dealt with by elders. Feeling of adequacy or inadequacy. Menstrual history.

5. Adult history: General temperament and character. Emotional adjustment. Feeling of adequacy or inadequacy. Happy or unhappy. History of occupations pursued and degree of success. Relationship to people connected with work. Feeling of resentment or repeated injustice endured. Hours of work and degree of strain.

Marital history: Domestic friction. General account of adult sexual life. (Note: It repeatedly happens in a psychiatric examination that the subject will at first maintain that his sexual life is perfectly normal and satisfactory, but later on when he is more at ease and feels the impersonality of the psychiatric approach to sex, he will tell an entirely different

story, revealing an important realm of maladjustment and anxiety.)

Domestic situation exclusive of marriage. Relationship to other members of the family.

Amount and type of recreation and exercise.

Use of drugs, coffee, alcohol, and tobacco.

In cases where mental deficiency is suspected a standard psychometric test form should be used, such as the Terman revision of the Binet-Simon test. In psychotic cases the outline of Dr. Kirby, published by the New York State Hospital Commission, is very convenient.

Clear-cut psychoneuroses are easily recognized. The most common is the so-called anxiety neurosis. The symptoms form such a common syndrome that it is worth describing more fully. One or more of the following is usually present:

1. Anxiety and apprehension either concrete or vague.
2. Irritability.
3. Difficulty in concentrating.
4. Absent-mindedness and apparent memory failure of intermittent type.
5. Tight sensations in the scalp, or feeling as if the scalp were going to blow off.
6. Headache—occipital or over the eyes, usually described as a weight on the brain or like the pressure of iron bands, hammering, or boring.
7. Precordial pain (the less intelligent the subject, the more diffuse the pain).

The one symptom most difficult to differentiate is pain. Pain of functional origin may simulate any condition. It tends, however, to be characterized by a certain vagueness or peculiar quality that makes it difficult for the patient to describe or accurately localize. This tendency is not revealed unless he is closely questioned. In the unintelligent it tends to be too diffuse. It is sometimes described as having qualities of movement or sound. The onset has frequently been preceded by similar pain in close relatives or friends. Exacerbations are often caused by emotional events. The pain often serves some obvious purpose, such as winning a law suit, proving to skeptics that he is really sick, or releasing one from unpleasant obligations (these mechanisms are usually unconscious).

It is very important to remember that the mere fact that a symptom is markedly influenced by emotional factors in no way proves it to be exclusively psychogenic. A mixture of organic and emotional elements is very common.

The psychoneuroses with physical symptoms as distinguished from those chiefly marked by anxiety are usually called conversion hysteria. The common symptoms are paresthesias, partial or complete loss of sensation in part of the body (this may include any of the special senses), muscular contractures, spasms, or paralyses. It should be mentioned that the inconstant symptoms of an early multiple sclerosis often simulate hysteria.

In addition to the disorders briefly outlined above, the following signs and symptoms are of special significance to the psychiatrist, and these should also be an indication to the medical examiner that a thorough psychiatric examination is needed.

1. Obsessions and compulsive acts. A necessity to perform certain daily acts according to a rigid ceremonial. Feeling impelled to make repeated examinations to make sure that the gas is turned off or doors locked. Extreme inability to make any decisions.

2. Marked feeling of inferiority.

3. Lack of energy or fatiguability without demonstrable organic basis.

4. Sexual worries. Sadistic or masochistic tendencies. Homosexuality and other sexual abnormalities. Impotence. (It is doubtful whether impotence is a psychiatric condition unless accompanied by nervous tension and anxiety, in which case it at least has psychiatric aspects.)

5. Emotional depression, exaltation, or marked instability. Feeling of unreality or sinfulness.

6. Difficulty in thinking, abnormal slowness or rapidity of speech or movement.

7. Any evidence of hallucinations, delusions, or abnormal behavior. Dementia præcox may show itself on superficial examination only in shallow emotionalism, excessive eroticism, vagueness, suspiciousness, or in apparent absorption in an inner phantasy while questions are answered in a rather mechanical way.

In addition to the definite psychoneurotics there are innumerable individuals who present comparatively slight difficulties in adjustment resulting in varying degrees of nervous tension, lowered efficiency, lack of energy, irritability, self-pity, or excessive prostration by grief. Many of these are greatly helped by a single psychiatric interview, and many should be referred to a psychiatrist for further counsel.

There are four possible results of the psychiatric examination:

1. No psychiatric condition may be found.
2. A psychiatric disturbance may be found and the subject advised to seek appropriate treatment.
3. If a functional disorder is present, the subject may receive sufficient enlightenment in the interview to be able to remedy the condition himself.
4. A functional condition may be found to be definitely the result of an insoluble life situation in which treatment would be useless. In this case, however, it is most important that the causal relationship between this situation and his symptoms be pointed out to the subject so that he will not continue to look for an organic basis, seeking relief in unnecessary medicine or surgery.

If an individual has a functional disturbance it is not sufficient that he be advised to consult a psychiatrist for treatment. Almost everybody believes the well-nigh universally accepted fallacy that disturbances of emotional origin are imaginary, rather unreal, and somehow the person's own fault. It is usually necessary to spend considerable time explaining the nature and reality of functional disease before the psychoneurotic subject will seriously consider going to a psychiatrist for treatment. Many people with functional disorders make a nearly complete tour of the various medical and neurological clinics, being dismissed from each without any attempt to explain to them the nature of the trouble. They are usually dismissed lightly or with contempt, the physician not realizing that the psychoneuroses are probably responsible for more suffering and disablement than any other disease. Many a suicide is the direct result of a neglected psychoneurosis. To tell the person that the condition is imaginary is not only untrue, but is usually the worst possible step for him. This

stimulates the subject, often unconsciously, to attempt to prove to the physician that he is "really" sick, which, in turn, produce an increase in symptoms. This false move also makes psychotherapy far more difficult, since the subject will interpret a cure as a humiliating confession of the imaginary nature of his trouble. The psychoneuroses, while of emotional origin, are as real as anything in the world.

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Section 11

THE ENDOCRINE SYSTEM

Introduction by Walter Timme, M. D.

In any examination of an individual, with reference to his progressive welfare and antedating the appearance of disease processes with a view of determining his points of least resistance to such disease processes, it is of supreme importance to determine his biochemical assets and the factors controlling their application to his economy, that is, his growth, development, sexual ability; his reactions to fatigue, disease, emotional disturbances; his powers of initiative and concentration; his digestion and assimilative ability, and many other of his vital functions, too obvious to mention here.

The control of the application of his biochemical factors to these processes of health and development resides largely in the units of the internal glandular system. These organs produce the regulators of the metabolic processes.

By modern methods of examination, both clinical and laboratory, it is now possible to gain some insight into the activities of the glands and their production. Their active principles have in several cases been isolated, notably, adrenalin, pituitrin, insulin, thyroxin, parathyroid extract (Collip), and possibly anterior pituitary extract. Variation from their normal activities can frequently be determined and abnormal changes in their mutual relations recognized. But these variations and changes in mutual relationship determine not only present difficulties but also future problems in the health and life span of the individual, and so their study offers enormous advantages in an early attempt at the recognition of preclinical signs of disease. They may be read similarly to a barometer for signs of storm long before the storm arrives, and in time frequently to take necessary precautions against it.

The clinical methods of examination of a subject for diseases of the endocrine glands can be readily learned by the

physician either by reading a modern book on the subject or else by attending clinics at which such examinations are conducted; while the various laboratories connected with the medical colleges and hospitals—to say nothing of the many well-equipped private laboratories in the larger cities—will ably assist him in his biochemical and *x*-ray investigations.

Examination of the Endocrine System

Signs and symptoms of ductless gland disorders are often objective, and while certain of them are easily identifiable, nevertheless cases of a combination of disorders of several endocrines occur which are frequently obscure and confusing. Theoretically, the functioning of any one gland depends upon the perfect secretory activity of several others. Hence, normal endocrine glands function in unison in the individual, in perfect glandular balance. Disturbance in any one of these glands is apt to destroy this balance and give rise to clinical symptoms in other endocrines.

Each of the endocrine glands has a definite period of activity, during which it exerts a powerful metabolic influence on various parts of the body. Timme groups these periods as follows:

1. Birth to puberty—thymic and pineal predominance.
2. Puberty to prime of life—the gonads (and during this and the earlier period an automatic control by the thyroid, adrenal, and pituitary).
3. Prime of life to dissolution—gradual glandular deterioration.

Thymus Gland

During this period of greatest activity the thymus influences the growth of the body, having marked vagotonic effects and an inhibitory action on sexual differentiation. It is believed to involute at the period of puberty, although there have been evidences of some thymic functioning continuing into later life.

Physiologically, persons of the hyperactive thymus type reveal their symptomatology as follows:

1. Skin (in male)—soft and velvety, pink cheeks, easily flushed.

2. Hair (in male)—lack of beard, female distribution of hair.
3. Teeth—uneven in size and shape.
4. Bones—loose-jointed, flail-like extremities, with epiphyseal joinings.
5. Genitalia—small and undeveloped.
6. Arteries, especially walls of aorta, narrow and thin.
7. Blood-pressure low, pulse slow, temperature subnormal.
8. Carbon dioxid tension low.
9. Low resistance to fatigue, illness, anesthesia, or shock.

Psychically, thymic individuals present negativism, dependence, and lack of initiative. They are often childlike in their ideas and behavior.

Pineal Gland

The pineal gland—like the thymus, predominantly active from birth to puberty—influences the growth of the body and muscular strength, as well as sexual and mental development. Pineal disturbance, as such, is rarely found. It is associated with evidences of thymic and pituitary disorders.

Pineal subinvolution is evidenced physiologically by lack of sexual and muscular development (clinically the undeveloped musculature may approximate dystrophia). In early case of subinvolution an *x*-ray examination of the skull reveals the so-called "pineal shadows." Psychologically the pineal type of subject is childlike and negative in his ideas and behavior.

Thyroid Gland

The thyroid is active from the time of birth to the prime of life, influencing the general metabolism, increasing the oxidative reactions of the body cells, and, in conjunction with other glands, ruling and governing the life cycle in all its phases. Its active element is thyroxin.

There are two general classes of thyroid disturbance: (1) hypothyroidism (cretinism and myxedema) and (2) hyperthyroidism.

Hypothyroidism

In hypothyroid cases there is a lack of thyroxin and of iron content in the blood, with a consequent reduction in the general bodily oxidative processes, which, in turn, result in diminished

metabolism, low blood-pressure, and lowered temperature. The skin is thick, dry, and boggy; the nails grow slowly, are brittle and seamed. The hair is coarse and lustreless. Mentally, the hypothyroid case is sluggish, dull, stupid, neglectful.

Cretinism.—When thyroid deficiency exists from infancy, the individual is underdeveloped both physically and mentally. Dentition is delayed; the skin is boggy and rests in folds on the body; the abdomen is prominent; the fontanels remain open; the tongue protrudes; the skin is dry, with typical cretinoid facies.

Myxedema.—Deficiency of thyroid secretion later in life is more likely to occur in females than in males. Myxedemic individuals note changes in their features, which become coarser, the face broadening and the skin becoming boggy. As the condition progresses kidney complications may ensue, with diminished urinary excretion and constipation, and there is gain in weight. Psychologically, the subject becomes stupid, defective in memory, and slow in thought and movement.

Hyperthyroidism

As opposed to hypothyroidism, hyperthyroidism indicates an excess of thyroxin, hence there is an increased general metabolism.

Thyroid hyperactivity is brought about through the following channels:

1. Toxic causes (infected tonsils, teeth, gall-bladder; food putrefaction).
2. Disturbances in other endocrine glands, with secondary effects on the thyroid.
3. Psychic trauma.
4. Disturbance in the autonomic nervous system.
5. Hereditary influences.

Hyperthyroidism is evidenced by the following characteristics:

1. General increase in all bodily functions (respiratory rate, pulse rate, basal metabolism—which later parallels the degree of thyrotoxicosis).
2. Profuse perspiration of hands and feet.
3. Cardiac palpitation and tremors of the hands, tongue, and even the muscles of the face.

4. Increased kidney function and alimentary activity.
5. Abnormal mental activity and unrest, worry, and fretfulness.

Exophthalmus may or may not be present in a definitely established case of hyperthyroidism, and is not synonymous with hyperthyroidism.

Adrenal Glands

The adrenal (suprarenal) glands consist of two types of tissue: (1) medulla and (2) cortex. Functionally, the medulla stimulates the sympathetic nervous system, which, in turn, regulates the blood-pressure and general muscle tone. The cortex inhibits the activity of the medullary secretions; and being so closely related to the gonadal system, it seems to have a curious effect on the secondary sexual characteristics (that is, female distribution of hair in the males and depressing effects on blood-pressure as do ovarian and testicular extracts).

Hypo-adrenalism

Conditions giving rise to hypo-adrenalism are:

1. Excessive exertion or fatigue.
2. Debilitating disease.
3. Improper diet (either qualitative or quantitative).
4. Disease of adrenal cortex (for example, Addison's disease, where there is excessively low blood-pressure, myasthenia, vagotonia, and skin pigmentation).

Individuals suffering from hypo-adrenalism lack muscular and vascular tone; are unable to cope with the strenuous activities of life (every activity is to them more or less of an exertion); are prone to shock from physical or psychic trauma; are liable to derangements of the smooth muscle system, such as asthma, urticaria, and angioneurotic edema; have, as a rule, low blood-pressure with a diminution in the blood-sugar; usually reveal various vagotonic disturbances (as gastric hyperacidity, intense perspiration, and slow pulse).

Hyperadrenalism

Hyperadrenal individuals are dynamic: they are physically overactive and mentally alert; the metabolic processes are in-

creased (rapid pulse and increased blood-pressure); exophthalmos may be noted.

This condition resembles hyperthyroidism in many ways, but can be differentiated from the latter by the following signs, according to Dr. Timme in his "Lectures on Endocrinology."

Hyperadrenalism.	*Hyperthyroidism.*
Blood-pressure increased.	Blood-pressure normal (except in advanced cases).
Hyperhidrosis only slight.	Hyperhidrosis.
Red blood-cells increased.	Red blood-cells normal or decreased.
Gastric acidity normal.	Gastric hyperacidity.
Peristalsis normal.	Peristalsis increased.

Pituitary Gland

This highly important gland is located in the sella turcica. It consists of an anterior and a posterior lobe, the anterior lobe being derived from cells originating in the pharyngeal cavity and discharging its secretions into vascular channels of the blood-stream, promoting growth and development; the posterior lobe arising from the floor of the third ventricle, into which it empties its secretion, influencing the carbohydrate and fat metabolism by inhibitory action on the pancreatic juice.

Causes giving rise to pituitary disturbances include:

1. Pressure on the pituitary body due to tumors or cysts of the gland, resulting in decreased secretory function. In this case there are secondary neighborhood-pressure symptoms, such as hemianopsia, internal strabismus, and—if the pressure is sufficient—symptoms indicative of pyramidal tract lesions. As the condition progresses choked disk, headaches, slow pulse, nausea, and vomiting occur.

2. Active hyperplasia of the glandular substance with associated hypersecretory activity.

Where clinical symptoms are manifested, *x*-ray of the skull of the subject may show a variety of changes in the region of the sella turcica. There may be a general contraction of the clinoid processes or there may be various degrees of erosion or no erosion with an increase in the sella mass.

Hypopituitarism

When hypopituitarism occurs in childhood it predisposes to adiposity, infantilism, and lack of sexual growth. Occurring later in life it gives rise to adiposity and reversive sexual infantilism (that is, rounded limbs, female distribution of hair, and fulness of breasts in the male).

Hypopituitarism is associated with increased sugar tolerance, subnormal temperature, and sluggish mentality.

Hyperpituitarism

Hyperpituitarism occurring before ossification of the bones gives rise to gigantism. There is a rapid growth of bone, a precocious sexual development leading to early puberty, and an increased urinary output with low sugar tolerance.

After ossification of the bones hyperpituitarism gives rise to acromegaly characterized by:

1. Gradual increase in size and coarseness of the features as the disease progresses.
2. Thickening of the jaw-bone and supra-orbital ridges.
3. Growth and thickening of the carpal and tarsal bones, giving rise to large, clumsy extremities.
4. Gradual increase in size of skull.
5. Spreading of teeth (due to rapid growth of the mandible and maxilla).
6. Kyphosis (may occur in later course of the disease).
7. Diabetes (symptoms often present, although the sugar tolerance is greatly increased).

Parathyroid Glands

The parathyroid glands rest on either side of the lateral lobes of the thyroid. They are believed to control the calcium metabolism. Experimental removal of the parathyroids in animals gives rise to voluntary muscle spasm, twitchings, and gradual paralysis.

A glandular disturbance associated with hyposecretion of the parathyroids or an absence of the parathyroids (such as occurs in some cases of surgical operation on the thyroid gland) is tetany. The symptoms of tetany are:

1. The characteristic position of the hands is flexure of the fingers at the metacarpophalangeal joint with the thumb flexed in the palm of the hand.
2. Wrists and elbows flexed.
3. Legs extended and toes adducted.
4. Paroxysmal spasms may develop in any muscle group of the body.

The Gonads

The gonads consist of the ovaries and testes. The interaction of the gonads with the thymus, thyroid, and pituitary glands demonstrates very well the intimate functional relationship existing between the various endocrines. Persistent thymus affects the sexual development. Thyrogonadal relationship is demonstrated in the clinical evidences of thyroid hyperactivity during the early menopause, supposed to be due to a glandular imbalance when the luteal secretion no longer functions as it should in regulating the usual thyroid secretory activity. The gonads, if destroyed early in life, would, it is believed, cause the individual to show evidence of pituitary overfunction, as in giants, and secondary sexual characteristics of the opposite sex.

Supplementary Investigations

The additional special tests and diagnostic measures listed below are indicated:

Suspected status thymicolymphaticus:
- Carbon dioxid tension of blood.
- Coagulation time of blood.
- Complete blood-count.
- *x*-Ray of chest.

Suspected thyroid disturbance:
- Basal metabolism test.
- Sugar tolerance test.
- Goetsch test.

Suspected pituitary change:
- *x*-Ray of sella turcica.
- Examination of fundus of eye and determination of visual fields.

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Section 12

THE SKIN

Introduction by George C. Andrews, M. D.

The skin is not the least of the many organs for which public health education has demanded periodic medical examination. Early recognition and treatment of cancerous and precancerous lesions offers of itself a fruitful cause for periodic examination of the skin.

The thorough timely removal of warts, moles, fissures, keratoses, and papillomas insures against the development of skin cancer, especially if these precancerous lesions are subject to chronic irritation from picking, smoking, pressure, or friction. Many adult skins show changes of premature senility, enhanced by exposure to sunlight, which if untreated are prone to degeneration into carcinoma.

It is an appalling fact that nearly all cases of cancer do not reach specialists skilled in giving proper treatment for an average of fifteen months after the lesion was first noted by the patient. In the majority of these cases, although the diagnosis was more or less entertained, the delay is occasioned by watchful waiting, or dilatory, unskilled treatment, which frequently does more harm than good.

Any discrete, infiltrated, crusted, or ulcerated lesion of over six weeks' duration should be classified as potentially cancerous or cancerous until otherwise proved. Cancer itself is often stony hard, but a knowledge of this characteristic should not preclude the diagnosis from lesions which to palpation are simply firmly infiltrated, because many cancers lack the stony hard feeling.

The skin is an important index to other disturbances of the body economy. Overeating, intestinal fermentation and putrefaction, biliary disorders, constipation, and lack of elimination are evidenced by a long list of pruritic eruptions, and focal infections in the colon, teeth, sinuses, or tonsils are frequently

indicated first by skin lesions. Eczema, erythema multiforme, chronic urticaria, localized or generalized pruritis, pityriasis rosea, alopecia areata, herpes zoster, and purpuric spots, so frequently relieved by colon irrigations, diet, and removal of focal infections, are common illustrations for the comprehension of the internist. Acne vulgaris is sometimes apparently connected with chronic appendicitis, and carbuncles or persistent furunculosis or pruritius deserve careful urinalysis for glucose or bile, or examination of the blood-sugar or bilirubin content.

Dermatitis upon the hands, wrists, and face due to local applications or cosmetic or occupational irritants are of increasing frequency. In recent years to the drug eruptions have been added those due to phenolphthalein, luminal, atophan, and acetanilid. Many pyogenic dermatoses are related to improper hygiene or focal infections, including dandruff.

Weakness of hemolysis in a Wassermann test should not be taken as an index of the virulence of a syphilitic infection. It is only a laboratory guide to be considered with clinical findings. It is not rare for treated cases of syphilis to develop active lesions while the Wassermann is negative. These lesions may be arterial, neurological, visceral, or cutaneous. Therefore all individuals who have ever had syphilis should have periodic medical examinations in addition to regular Wassermann tests, at which times the skin and mucous membranes should receive thorough attention.

Examination of the Skin

It is not possible within the limits of this manual, nor is it desirable, to discuss in minute detail any of the affections of the skin or its appendages, or to consider their pathology, prognosis, or treatment, but rather to draw attention to some of the more common diseases, especially those likely to be encountered in the course of a complete physical examination and to mention some of the skin manifestations of systemic disease. It is this latter phase which will be of particular interest to the internist, as the color and the texture of the skin, the condition of its secretory glands, and the condition of the hair and nails

often reflects abnormalities involving the various internal organs of the body, especially those concerned with the circulation, with the biliary passages, with the blood-forming organs, and with the organs of internal secretion.

It must constantly be borne in mind that all skin lesions are not local and due to external causes, but that many are simply the outward expression of systemic disturbance. The exanthemata, the lesions of syphilis, the drug rashes, and the eruptions due to protein hypersensitiveness are all the result of general bodily disorders or disease.

Physicians called upon to make periodic health examinations are not supposed to be specialists in every branch of medicine, but it is expected that the average physician will be able to identify such common maladies as acne, tinea versicolor, scabies, urticaria, seborrhea, psoriasis, pediculosis, pityriasis rosæ, ringworm, eczema, erythema multiforme, dermatitis venenata, herpes zoster, and impetigo contagiosa, etc., when found in typical form.

No opinion should be given until the skin of the entire body has been carefully inspected. Often puzzling lesions are correctly diagnosed after typical lesions have been discovered elsewhere upon the body. The physician should be constantly on the lookout for such chronic ulcerative lesions as are seen in carcinoma, syphilis, and tuberculosis. He should carefully guard against causing undue anxiety in individuals presenting cancerous and luetic lesions. At the same time it should be made plain to such individuals that the condition is not one to be lightly dismissed, and that they should immediately seek the service of someone competent to treat such conditions.

It is a sort of unwritten law among dermatologists to proceed with the examination and to attempt a diagnosis before any history has been obtained. The history is then sought and the diagnosis confirmed, changed, or modified, as the case may be.

Examination should always be made by daylight where possible, since the question of color is of especial importance. If this is not practicable, then the examination should be made under so-called daylight lamps.

Begin with the scalp. Note the presence of skin lesions; see if the scalp is oily or dry; note the condition of the hair;

study the eyebrows. Examine the skin of the face, neck, and shoulders; look for pallor suggesting anemia, cyanosis denoting impairment of the circulation, bronzing, as in Addison's disease; the green color of chlorosis; the lemon-yellow hue of pernicious anemia. Study the color and condition of the skin of the upper extremities, the chest, and the back. Examine the skin of the abdomen, genital regions, and the lower extremities.

Is the skin tense or loose? Is it moist or dry? Is there overactivity of the sebaceous glands? Is there edema present? Study the condition of the axillary, thoracic, and pubic hair. Is the hair scant, as in status lymphaticus, and is the distribution of the pubic hair of the male or female type?

Examine the finger and toe nails. Look for trophic disturbances and for evidence of paronychia. It is to be remembered that ringworm and psoriasis may involve the nails.

If skin lesions are present and cannot be diagnosed, then they should be accurately described, and for this purpose the usual terminology should be employed. With this in view we are listing below primary and secondary skin lesions:

Primary lesions.		*Secondary lesions.*	
Macules,	Vesicles,	Excoriations,	Infiltrations,
Papules,	Blebs,	Fissures,	Pigmentation,
Nodules,	Pustules,	Desquamation,	Ulcerations,
Tumors,	Wheals.	Scabs or crusts,	Scars.

Lesions must also be described as to size, shape, color, and location. Is the lesion unilateral or symmetrical? Local or generalized? Is it confluent or discrete? For the purpose of describing the shape of lesions such terms as oval, round, circinate, annular, polygonal, serpiginous, gyrate, and linear may be used. In studying lesions in minute detail a hand glass of moderate magnification will be found useful.

It should be remembered that the original appearance of a skin lesion may be so altered by scratching or by the occurrence of secondary lesions that it is no longer recognizable. Moreover, treatment will change the color and character of a lesion and make it difficult or impossible to diagnose. Bear in mind that lesions due to internal disturbances are symmetrical and frequently attack the greater part of the skin of the entire body; while those due to parasites and to external irritants begin

locally. Be on the lookout for occupational skin affections, such as eczema of the hands and arms in plasterers, eczema of the hands in furniture polishers, etc. It should be borne in mind that paronychia, especially when painless and unaccompanied by pyogenic infection, is frequently the result of syphilis. Carefully palpate the usual regions of the body for enlarged or painful lymph-nodes.

History

After the examination is completed, and if abnormalities have been found affecting the skin, inquire as to the date and mode of onset; the location of the first lesion to appear; if itching is present; if the condition is painful or painless; if the condition is subsiding or progressing; if other members of the family are similarly affected; whether or not there has been treatment, and the nature of the treatment. When a skin lesion appears to be one which is known to run a short course, but the history shows that it has been present for months or perhaps years, it will frequently be necessary to change the original opinion.

Supplementary Investigations

The additional special tests listed below are indicated:

Wassermann test:

In all instances where there is evidence or history suggesting syphilis.

Microscopic examination:

Exudates.

Crusts.

Scales.

Scrapings obtained from parasitic diseases and diseases caused by fungus growths.

Biopsy:

In benign lesions where microscopic examination is considered necessary.

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Section 13

HERNIA

Introduction by Edward Martin, M. D.

When one says of a man "he has a hernia," this implies that he has a protrusion of gut or omentum, or both, in the region of the groin. When this is said of a woman or an infant further specification is needful, since it is often in the umbilical region.

Whatever be its location, hernia is a harmful factor only so long as the viscera protrude. When replaced, the health menace becomes simply a potentiality and so remains as long as the replacement is maintained.

The health menace of the unreduced or intermittently recurring hernia is twofold: it forebodes strangulation, it insures progressive development of the protean symptoms of intestinal toxemia, and crippling of bodily activity.

Strangulation with its usually rapidly fatal termination occurs in the hernias of the young and is favored in its development by the wearing of a truss which does not consistently maintain reduction either because of mechanical inadequacy or because of carelessness in its use. Strangulation is rare in the inguinal hernias which develop at or after middle age. These hernias due to fascial yielding have a wide aperture, and except for trauma incident to undue truss pressure do not form adhesions within the sac. The underlying cause of these hernias is that bagging forward of the lower part of the belly which allows the visceral weight to push forward rather than downward into the pelvis.

Chronic intestinal toxemia manifest by any or every form of chronic ill health, though not completely crippling, negatives the joy of living. It is an almost inevitable consequence of all hernias the contents of which cannot be retained in the belly cavity.

Hernias detected early are most amenable to efficient palliative or radical treatment. Hence the need of a careful search for the beginning of rupture or a tendency thereto.

Examination for Hernia

In this section no attempt has been made to consider either the anatomy involved or the treatment which may be indicated by the findings of the examination, as these phases of the subject do not properly come within the scope of this manual. It will suffice merely to suggest the types of hernia that are usually found in the course of the health examination and to discuss briefly the technic to be followed in examining this region of the body.

It may not be out of place here to direct attention to the importance of a *properly fitted* truss, if one is worn. This point should be noted by the physician at the time of the examination.

Common Types of Hernia

Inguinal Hernia.—This is the most common type of hernia found in both men and women, although it occurs more frequently in men than in women. Too much stress should not be laid upon relaxed inguinal rings, as these are frequently present in individuals who have done heavy manual labor for years, without any evidence whatever of hernia.

The examination should be made with the parts exposed, the subject standing erect on the floor, feet separated. In examining the right inguinal region the physician should stand in front and somewhat to the right of the subject, his right index-finger invaginating the scrotum and passing up into the external inguinal ring. The subject is asked to cough, strain, and bear down on the abdominal muscles. In this way the hernia, if present, will in most cases be felt to bulge or protrude. In examining the left inguinal region the physician stands to the left of the subject and uses his left index-finger for palpation. It is frequently possible to identify hernia merely by inspection, especially when a mass appears in the region of the inguinal canal, and more especially when the hernia becomes complete and passes down into the scrotum.

It is well to remember that hernia cannot always be excluded in a single examination. Therefore, where there is a history or where a truss is being worn, and negative findings are obtained, it is well to have the subject return later for a check up of the condition.

In women the examination for inguinal hernia is somewhat more difficult, as the index-finger cannot be passed into the inguinal ring and the examiner must depend for his judgment upon the presence of an expansile tumor in the inguinal region when the subject coughs or strains. Occasionally the hernia becomes quite large and finds its way down into the labia majora.

Femoral Hernia.—The fact that femoral hernia has been for years recognized to be much more common in women than in men has led some physicians to take the erroneous view that it is the most common type of hernia occurring in women. Femoral hernia can at times be detected by inspection alone, in both men and women, if the tumor mass has become sufficiently large—the mass lying below Poupart's ligament and in close relation to the femoral vessels. During palpation the physician can feel the expansion of the mass when the subject coughs or strains. Femoral hernia may be reducible.

Umbilical hernia, especially when small, is frequently present in both men and women (particularly women who have borne many children). It is rarely the cause of symptoms. It can usually be demonstrated with the subject in the recumbent position as well as when he stands. When the subject coughs or strains the umbilicus protrudes, and the palpating finger, by forcibly counteracting the protrusion, can frequently feel the contents of the hernial sac slip back into the abdomen.

Epigastric Hernia.—This small hernia—so small sometimes as to be scarcely recognized—is troublesome, being at times responsible for marked upper abdominal symptoms. The symptoms associated with it (sense of weakness in the abdominal wall, pain, swelling, vomiting) result from incarcerated omentum or intestine. It is situated in the linea alba, usually about halfway between the umbilicus and the ensiform cartilage, and is recognized by palpation of the linea alba. It is more common in men. Sometimes there is a small protrusion and again only a small dimple in the midline.

Ventral Hernia (Postoperative).—In the majority of cases ventral hernia is of the postoperative type, and is usually found in cases where it has been necessary to drain the abdomen at the time of the operation. The process of draining weakens the abdominal wall at that point and the hernial sac finds its way

along the drainage tract. The protrusion can readily be seen in the scar when the subject stands and coughs. It can be felt to expand when the intra-abdominal tension is increased, and to crepitate when it is forcibly replaced. (Replacement, however, is frequently impossible, as adhesions are generally present.)

Uncommon Types of Hernia

Lumbar hernia occurs in Petit's triangle and is found, usually, as a protruding expansile mass when the subject coughs or strains. It is sometimes of spontaneous origin, but more often is found to be postoperative in cases where there has been a kidney operation or an abscess opened in this locality.

Obturator hernia is found on the inner side of the thigh, just to the side of the femoral vessels. It passes through the obturator foramen with the obturator vessels and lies deep in the thigh (rare in the male; in the female is limited to the aged—Moschcowitz).

Sciatic hernia emerges from the pelvis through one of the sciatic foramina and appears in the gluteal region.

Perineal hernia is found as an expansile tumor in the perineum.

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Section 14

THE UROLOGICAL SYSTEM

Introduction by Edward L. Keyes, M. D.

In a thorough examination of supposedly healthy people there is no region where latent trouble or possible foci of infection, or even of malignant change, may be so easily overlooked as the genito-urinary region. A very thorough routine should be followed in this region even by the general practitioner who undertakes to make a competent examination of the whole body. There are certain warning signals that he should heed.

The examination of the urinary organs implies what Osler declared one of the chief functions of the consultant, viz., rectal palpation. It implies much else—*e. g.*, cystoscopy, radiography, and their appurtenances for the study of function and macropathology—but these lie within the sphere of the specialist, while rectal touch should be the daily practice of every diagnostician. Yet, unfamiliarity with this method of examination is even today an unfailing source of incomplete or erroneous diagnosis.

A second item: the initial symptom of malignant neoplasms of the viscera is often so insignificant as to be overlooked or misinterpreted. No less so here. Every hematuria should be attributed to neoplasm until proved due to other lesion. And the more readily a severe bleeding is controlled by "kidney pills" or other infallible and inadequate remedies, the more it cries "neoplasm!"

For like reason he who makes the diagnosis of hydrocele by aspiration will some day commit the unpardonable error of puncturing a malignant teratoma.

Examination of the Urological System

Careful routine examination of the urological system of all examinees should be made. (Examination of the genital organs

in the female is considered in Section 15 on Gynecology.) The male should be examined in the following order:

1. Penis.
2. Scrotum.
3. Testes.
4. Epididymis.
5. Spermatic cord.
6. Prostate and vesicles.
7. Kidney.
8. Bladder.

Special examination of bladder, ureters, and kidneys, or an *x*-ray examination may be necessary.

Penis

The first thing to be considered is the presence of a urethral discharge. Therefore it is important to examine the penis before urine is passed and before the prostate is examined.

The foreskin is retracted and the glans held in the fingers and compressed, in order to force through the meatus any secretion that might be present. If secretion is not present, the urethra should be milked to obtain secretion that might be present in the deeper portion. If secretion is present, the character should be noted, and material should be spread upon a glass slide for microscopic examination. The presence of a morning drop is usually the result of an old stricture, urethral ulceration, prostatic disease, or a chronic inflammatory condition involving the region of the verumontanum.

In some cases retraction of the foreskin will be impossible and should be noted; also note paraphimosis when present. The skin covering the penis should be examined for ulcerations, venereal warts, and other skin conditions (see Section 12, The Skin).

Now examine the meatus and note the size.

Abnormalities of the urethra, such as hypospadias and epispadias, should be noted when present.

Examine the glans carefully for chancre, chancroid, other ulcerations, epithelioma, venereal warts, etc.

Examine the mucous membrane carefully behind the corona and note the presence of any abnormality.

Scrotum

Inspect the scrotum carefully for skin lesions (see Section 12, The Skin). If the scrotum is unusually long, it should be noted and suspensory advised in the summary when indicated.

The commoner skin conditions which involve the scrotum are eczema, tinea cruris, eczema marginata, sebaceous cysts, ulcerations, chancre, chancroid, tumors, elephantiasis.

Testes

Now examine the testicles and note any abnormality in size, shape and consistency, and any abnormal tenderness. Some of the conditions involving the testicles are as follows: (1) absent or undescended testicles, (2) atrophy, hypertrophy, (3) inflammatory conditions, (4) sarcoma, (5) carcinoma, (6) teratoma, (7) syphilis, (8) blastomycosis, (9) orchitis secondary to parotitis.

Palpate the epididymis, noting size and consistency. Most of the inflammatory conditions of the epididymis are secondary to gonorrhea. Tuberculosis of the epididymis should be suspected when the epididymis is large, nodular, and insensitive. This conclusion is fortified when tuberculosis of the kidney or pulmonary tuberculosis is known to exist.

Spermatic Cord

Grasp the spermatic cord between the fingers and palpate it thoroughly throughout its course from epididymis to the external abdominal ring. Separate the vas deferens and examine for nodules and tumors. Palpate the veins and note enlargement and tortuosity (further examination for varicocele should be made after the subject has been allowed to stand for a few minutes, when the veins will become more prominent). The veins on the left side of the scrotum are normally larger than those on the right side due to the difference in length and to the difference in the way in which the veins empty on the two sides.

Tumors and hydrocele of the cord should be noted. Hydrocele of the tunica vaginalis is a fairly common condition, but it must be differentiated from scrotal hernia. This is accomplished by considering the history, by physical examination, by transillumination, and by the absence of signs of hernia (see Section 13, Hernia).

Transilluminate all suspected hydroceles, remembering, however, that in hydroceles which have existed for years—particularly those in which hemorrhages have occurred (spontaneous or after tapping, traumatic)—the wall becomes so thickened that transillumination does not give the usual signs.

The technic for transillumination is as follows: Have the room dark and place an electric penlight behind the scrotum. Roll an ordinary blotter (or similar sized piece of paper) into a tube about $1\frac{1}{2}$ inches in diameter, and place this tube against the scrotum on the opposite side from the light. With the eye near the open end of the tube look for the presence of light passing through the tumor. If the tumor contains a clear fluid and the walls are not unduly thickened, the light will be clear and even, while if it is composed of solid material, light is not transmitted.

Prostate

Examination of the prostate is best made with the subject standing, feet separated. Have him bend forward over the examining table, resting his elbows on the table. The index-finger of the examiner's right hand is protected by a finger-cot. After being lubricated, it is passed into the rectum as far as possible, and the prostatic region palpated through the anterior rectal wall. Note the following points:

1. Size of prostate, symmetry, the presence of nodules.
2. Is prostate hard or soft and boggy?
3. Is examination very painful to the subject?
4. Are there localized areas of especial tenderness?
5. Can the seminal vesicles be felt? (These are situated to either side of the midline and as far up as the finger can reach or a little further up than can be reached with ease.)
6. Is the vesicle normal?

It should be borne in mind that small, fibrous prostates may cause even more trouble than large prostates. Also, that enlargement of the middle lobe of the prostate alone is sufficient to cause annoying symptoms. Consider the question of residual urine. The conclusion should not be reached that the prostate is enlarged simply because it can be felt. Remember that any strong index-finger can cause pain when used too energetically in examining the prostate.

Fig. 25.—Correct position for examination of the prostate gland.

Kidney

The kidney on both sides is carefully palpated as described in Section 8, The Abdomen and Gastro-intestinal System, noting the size, position, and extent of mobility, if any, tumors, etc.

Some of the tumors which involve the kidney are carcinoma, sarcoma, hypernephroma.

Hydronephrosis, simple and polycystic, also causes enlargement, sometimes to a marked degree. (Congenital hydronephrosis is practically always bilateral.)

The question of nephritis and pyelitis, both acute and chronic, must be kept in mind. Renal colic and torsion of the ureter and kidney pelvis present similar symptoms.

Supplementary Investigations

In addition to the fundamental examination outlined above, special examinations may at times be necessary: (1) examination of the bladder, ureters, and kidneys, and (2) *x*-ray examination.

In certain instances cystoscopic examination should be recommended. This is indicated in all cases of unexplained hematuria, in suspected vesical calculus, in diverticulum, in tumors of the prostate, ureteral calculus, in tuberculosis of the kidney and bladder.

x-Ray examination of the urinary apparatus is made for the purpose of determining the size, shape, and position of the kidneys; the presence of calculi in the kidney or its pelvis; the presence of calculi in the ureter and bladder. Remember that pure uric acid stones are not revealed by the *x*-ray. The frequency with which urinary calculi are shown on *x*-ray examination is directly proportionate to their calcium content. Pyelography should be recommended in cases where it is important to know the size and shape of the kidney pelvis, as in suspected tumors, tuberculosis, etc.

The additional special tests and diagnostic measures listed below are indicated:

Suspected impairment of kidney function:
- Urine concentration test.
- Blood chemistry.
- Dye test.
- Periodic analyses.
- Catheterized specimens (for women).

Suspected calculi in kidneys, bladder, ureters, vesicles, unexplained hematuria, diverticula:
- *x*-Ray of region.
- Cystoscopy.

Suspected tuberculosis:
- Pyelography.
- Cystoscopy.
- Special microscopic examination of urine sediment.

Suspected or found tumors of kidney and prostate:
- *x*-Ray of region.
- Pyelography (if in kidney).
- Cystoscopy.

Urethral discharge, present or history of:
Repeated urinalyses.
Microscopic examination of discharge or material obtained after prostatic massage.
Ulceration:
Microscopic examination of scrapings.
Chancre suspected:
Dark-field examination of material.
History of syphilis, or findings suggestive of syphilis:
Blood Wassermann test.
History of gonorrhea:
Blood Wassermann test.[1]
Gonococcus fixation, if active infection is suspected.
Sterility:
Microscopic examination of fresh speciman of seminal fluid.

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[1] The blood Wassermann test is recommended as a protective measure in all cases giving history of gonorrhea. Experience shows that syphilis is present in many who have had gonorrhea, but who are unaware of the presence of syphilis.

SECTION 15

GYNECOLOGY

Introduction by John Osborn Polak, M. D.

The amount of functional disturbance as well as definite pathology that exists in any representative group of civilized women warrants a periodic check-up of the breasts and generative organs.

Woman is a creature of her endocrines. In the fully developed woman the sex glands predominate and preside over the harmonious interglandular action of her endocrine system.

No physical examination can be considered as complete without investigation of her pelvic organs—not only as to their physical state, but as to the neuropsychopathic factors which may enter into the functional disturbances with their attendant reflex effects upon her general health.

This is particularly true at the periods of puberty, during sexual maturity, and at the menopause; for at these periods the woman enters upon new developments, assumes new obligations, and there is a consequent nervous unbalance.

At puberty the girl undergoes a transition from the child to the woman, with the consequent physical and psychic changes. Menstruation occurs and with its appearance the symptoms of developmental anomalies may be recognized and the conditions corrected.

During sexual activity the infections and the traumatisms of childbirth make up a large proportion of gynecological disease, which directly or indirectly impairs the woman's health. Careful investigation of the pelvic organs during this period should be the routine of every physical examination.

As she nears the period of the menopause and the postclimacteric the incidence of cancer reaches a high frequency. Fibroid tumors may be found in from 20 to 30 per cent. of all women reaching the age of forty. This means excessive blood loss and secondary anemia. The nervous unbalance at the menopause is usually exaggerated. As many women carry the

fear of cancer, periodic examinations at this time permit us to give positive assurance as to the absence of this dread disease or afford us opportunity to recognize the earliest signs, institute proper treatment, and assure a cure.

Fortunately, women are being educated as to the necessity of periodic examination in the interest of general health. There can be no question, in view of the fact that the pelvic and mammary organs are subject to trauma, sudden hypertrophy, and infection, that the necessity of this periodic check-up exists and should be made a part of every general examination in women.

History

Before proceeding to the examination it is important to obtain a gynecological history, both past and present, and to make a record of the essential facts brought out.

Menstruation.—Ascertain the age at onset, regular or irregular, duration of period, interval in days, amount of flow, *i. e.*, scanty, moderate, excessive. Occasionally the amount of flow is better estimated by inquiring as to the number of napkins used. Are clots present? Has there been recent increase or decrease in flow? Have there been omitted periods? What was the date of the last period?

Dysmenorrhea.—Is pain premenstrual or comenstrual? Is it dull or dragging or intense? Inquire as to the duration and location of pain. Is it sufficiently intense to require the individual to remain in bed or to be absent from occupation?

Leukorrhea.—Date of onset. Was the appearance gradual or abrupt? Is there tenderness about the vulva and is painful urination present? Inquire as to the character of the discharge. Is it sufficiently profuse to require the use of napkins or douches?

Urination.—Is urination frequent, urgent, painful? Is it necessary for the patient to get up during the night to void and, if so, how many times? Is there history of previous bladder trouble, blood or pus in the urine? Is there history of bed-wetting in childhood?

Pregnancies.—Inquire if there have been abortions or miscarriages and how many and the month of gestation during

which the miscarriage occurred. Was it spontaneous or induced? Inquire if curettage was done. Were any of these pregnancies followed by infection, fever, and how long was it necessary to remain in bed? Have there been premature births? How many full-term children, living and dead? Were labors normal or abnormal? Ascertain particulars. Were any other operations performed?

Menopause.—Date of last period. Have there been flushes, nervousness, depression, or excitement? Has there been any evidence of blood since the last period?

Breasts.—Abnormal growths or lumps; history of abscess; nipple irritation; pain or soreness in the breasts.

Operations.—Inquire as to other operations not already covered. Has there been gynecological treatment of any kind and, if so, the nature, date, and result.

Examination

It is essential that the greater part of the clothing of the subject be removed and that she assume the recumbent position on a suitable table equipped with foot or leg rests. The patient is now carefully draped with sheets with only the parts under examination being exposed. The bladder and rectum should be emptied before the pelvic examination is made. The routine examination follows:

Mammary Glands

Inspection of the breasts includes observation of:

1. Contour.
2. Condition of nipples.
3. Scars.
4. Dimpling or induration of the skin.
5. Eruptions and ulcerations.
6. Pigmentation of the areola.
7. Differences in size and level of breasts.
8. Secretion from nipples.

Palpation should be carried out with the subject first standing in an erect position and then recumbent upon the table, the arm only slightly abducted. Palpate the axilla and edge of pectorals for enlarged lymph-nodes and all quadrants of the breast for:

1. Discrete masses.
2. Outline of masses, as differentiated from diffuse fibrositis.
3. Evidence of chronic mastitis.
4. Pain or tenderness on manipulation.

Now with the subject on the table examine the breast tissue. The examiner's hand gently flattens the breast tissue against the chest wall. Normally the breast tissue spreads out evenly in a diffuse mass. If it contains cystadenomata

Fig. 26.—Examining for tumor masses. By placing the hand firmly against the breast these are made to stand out and are more readily recognized.

or malignant growths, these will stand out definitely as discrete nodules or hard masses—usually irregular in outline, retracting the nipples, and forming adhesions with the skin.

Search again carefully for secondary involvements of the axillary nodes.

External Genitalia

Direct the light (head mirror) full on the *vulva*. Separate the labia with the fingers of one hand. The abnormal conditions which may be seen include:

1. Urethral caruncle.

2. Enlargement of Skene's and Bartholin's glands.
3. Skin lesions of the vulva and perianal region.
4. Procidentia.
5. Relaxation of the vaginal outlet.
6. Congenital atrophy.
7. Excessive pigmentation or passive congestion.
8. Edema of the labia.
9. Pediculi.

Enlargement of the inguinal lymph-nodes should be looked for, as they usually indicate infection or may be secondary to pelvic new growths.

When the pelvic floor is relaxed the degree of prolapse of the vaginal wall is best ascertained by placing the forefingers of the two hands in the two lateral sulci of the torn perineum and pressing firmly downward toward the buttocks, the subject straining as in the act of defecation, so that the anterior and posterior walls roll outward, revealing the amount of cystocele or rectocele present. Determine the thickness of the perineal floor by grasping it between the thumb and fingers.

Cervix and Vagina

Inspection.—For the purpose use a well-lubricated bivalve speculum, introducing it very gently with the same downward pressure as that exerted by the examining fingers in the bimanual introduction described below. Carry the speculum upward to its full length, adjust to an angle of 90 degrees, open the blades, and fix in place with a set screw. Direct a clear light with the head mirror on the cervix and upper vagina and inspect these parts, noting:

1. Condition of cervix, character and origin of any discharge (scanty, moderate, profuse, serous, mucoid, mucopurulent, sanguineous).
2. Lacerations, ulcerations, erosions.
3. New growths, cysts, hypertrophy, polyps, scars, etc.
4. Scars in vaginal vault.
5. Adhesions between cervix and vaginal vault.

Bimanual Palpation.—The subject is requested to relax completely, separating the legs widely and inhaling deeply. The examiner's hand, previously gloved, takes the position of pronation, exerting pressure downward and backward with ex-

treme gentleness, to avoid causing pain or spasm or contraction of the muscles of the abdomen and thighs. The examining forefinger, well lubricated, is inserted in the vagina, and as relaxation occurs the middle finger is also introduced. When the cervix is reached the external os is palpated and such conditions noted as:

1. Size and direction of cervix.
2. Type and extent of lacerations.
3. Hypertrophy or atrophy.
4. Cystic nodules.
5. Eversion and malignant infiltration.
6. Os open or closed.

The finger next investigates the anterior vaginal wall, noting the presence of the anterior wall of the uterus if it is in forward position, and calculating the amount of angulation between the cervix and the body.

The fornices, lateral and posterior, are examined for scars, cysts, or infiltrations. The presence of protrusions from above may be caused by tumor or pelvic abscess.

Uterus.—The examiner's other hand is now placed on the abdomen, just below the umbilicus, to determine the position of the uterus. Place the examining fingers under the cervix and lift the uterus toward the abdominal wall until the free hand can palpate the fundus, noting size, consistency, contour, and mobility. When resistance is met, direct the subject to take a long breath, exhale slowly, and at the same time relax the abdominal muscles. The examiner holds the position gained and directs the subject to inhale and exhale several times. In this way all resistance can be overcome in most cases and a satisfactory examination completed.

If by lifting the uterus toward the anterior abdominal wall the fundus cannot be felt by the abdominal hand, the uterus is small or is in some form of malposition. Determine the degree of retroposition by forcing the vaginal forefinger deep into the posterior fornix and palpating the posterior wall of the uterus.

Adnexa.—In a normal pelvis the adnexa cannot be felt by the abdominal hand, and unless the subject is very thin the vaginal finger can feel only the lower pole of the ovaries. A normal tube cannot, ordinarily, be palpated. The adnexa

are forced downward toward the vaginal fingers (which are in the lateral fornix of the vagina) by pressing deeply inward and downward with the abdominal hand toward the lower left or right quadrant of the subject's abdomen as if to meet the finger in the vagina.

Bimanual examination of the adnexa may reveal the presence of such pathological conditions as:

1. Cysts or tumors.
2. Salpingitis.
3. Chronic pelvic inflammations with adhesions.
4. Tubal pregnancies.

The Uterus

The normal position of the uterus is about halfway between anteversion and anteflexion. After the menopause the normal position of the uterus is slightly retroverted. One of the commonest errors in determining whether there is retroversion is to mistake an anteflexion with retrocession for a retroversion. This mistake need never be made if the vaginal finger feels the anterior angle between the fundus and the cervix. Retroverted uterus from lax supports is always to a slight degree prolapsed.

First-degree retroversion: Determined by the external hand on the abdomen, which feels the fundus pointing away from the bladder.

Second-degree retroversion: The fundus cannot be felt either by the abdominal hand or by the internal vaginal finger, and the cervix points in the direction of the long axis of the vagina.

Third-degree retroversion: The posterior wall of the uterus can be felt by the vaginal finger dipping backward into the culdesac of Douglas. If there is also present a retroflexion, the angle formed between the body and the cervix is readily felt; the cervix points in the direction either of the axis of the vagina or forward toward the anterior wall of the vagina.

Infantile Uterus

Infantile uterus may appear in two forms. In the first form, the uterus, while in normal proportions and fully developed, is miniature in size. In the second, and far more

common form, it displays marked lack of proportion between the body and the cervix—the latter being longer than the body, with sharp anteflexion or retroflexion, and axis parallel to the vaginal axis. A history of dysmenorrhea, sterility, or amenorrhea is generally found.

Uterine Fibromyomata

Fibromyomata are frequently found, particularly in middle-aged, unmarried women. Many cases are insignificant and of little importance; but when they are large enough to produce pelvic pressure and cause other secondary symptoms from loss of blood, they should receive the consideration of a physician.

Fibroid tumors are classed as (1) subserous, (2) submucous, and (3) intramural. They present a characteristic, hard, nodular consistency which is easy to recognize. They are seldom tender, unless adhesions are present. Submucous tumors are usually accompanied by menorrhagia, the hemorrhage sometimes being so severe as to result in profound secondary anemia.

Signs of degenerative changes in old tumors, a history of intermenstrual flow, and invasion of the surrounding tissues by induration are all suggestive of malignant growths. Neoplasms of the cervix are comparatively easy to detect except in the very earliest stage before induration is present.

Cancer of Uterus

Cervix.—Ordinary erosions of the cervix frequently simulate early cancer. For instance, cervicitis with cyst formation would suggest infiltrating cancer of the cervix, and such an erosion will bleed freely on digital examination. The presence of cysts is therefore usually sufficient evidence that the condition is not cancer; nevertheless, the diagnosis should be left to the clinical consultant.

Where advanced cancer is actually present, the inspection of the cervix may reveal "cauliflower" masses which bleed easily to touch, or a hard irregularity of the cervix with ulceration. The three cardinal symptoms usually found are:

1. Intermenstrual bleeding in late adult life and bleeding after the menopause.

2. Increased amount of leukorrhea with foul, watery discharge, becoming blood-tinged.

3. Pain.

Ordinarily, cancer of the cervix occurs between the ages of thirty-five and forty-five, but it has been known to occur as early as twenty-three and after forty-five. It is most common in women who have borne children in contrast with carcinoma of the body of the uterus, which is most prevalent in women who have not borne children.

Fundus.—Cancer of the fundus occurs in about 13 per cent. of the cases of cancer of the uterus; and of these about 50 per cent. occur between the ages of fifty and sixty. Cancer associated with uterine fibroids may be difficult to detect, as the only symptoms are leukorrhea and menorrhagia, bloody discharge and foul odors rarely appearing until the late stages. In every case there should be microscopical examination of the curettings.

Rectal Examination

In virgins and young girls the pelvic examination by rectum should be preferred, as there is little difficulty in determining the position and size of the pelvic organs in this way. (A rectal check-up of the pelvic conditions will be unsatisfactory, however, if the rectum is full.)

Note the condition of the sphincter. If it is lacerated, determine whether continent for feces or gas. The cervix feels unduly large through the walls of the rectum, and should not be mistaken for a retroversion, ptosed ovaries, tumors of the tubes, or nodules on the posterior wall of the uterus.

Supplementary Investigations

It is to be remembered that slight degrees of retrodisplacement of the uterus are commonly present, but without symptoms. These cases require no special comment. It is also to be remembered that backache of varying degree is not uncommon in women. This, in the majority of cases, is due to other causes than pelvic disease; and postural defects, deformities of spine, pelvis and feet, and the existence of focal infection somewhere in the body should be ruled out before the reproductive organs are blamed. We have enumerated

below certain tests which may be indicated after the physical examination is completed.

Questionable discharges, intermenstrual bleeding and menorrhagia, tumors, foul odors, pain:

Repeated gynecological observation.

Microscopical examination of discharge, smears, scrapings, curettings.

Complete blood-count.

Evidences of inflammatory changes and history of venereal disease:

Blood Wassermann test.

Gonococcus fixation.

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SECTION 16

THE ANUS AND RECTUM

Introduction by Jerome M. Lynch, M. D.

A physical examination is not complete without rectal exploration. This should be a matter of routine.

The multitudinous lesions of the caudal end of the alimentary canal may be the unsuspected cause of esoteric stomach symptoms; and since the sympathetic nervous system terminates here the lesions in this locality cause wide-spread disturbance.

The most frequent site of cancer in the alimentary canal, excluding the stomach, is the rectum. All cancers at the start are local. In the rectum this early tumor is usually a button-like projection from the mucosa and is easily detected by examination.

Trigonitis and sciatica are not infrequently due to an anal fissure.

It is, therefore, important not to neglect the rectum when examining a patient.

There is nothing difficult about the use of the proctoscope once the physician has learned to introduce it painlessly, and he will soon appreciate any pathology within its reach.

Examination of the Anus and Rectum

The examination should be conducted in a good light with the subject in the left or right lateral position. If only one examination is possible, the subject should have been prepared by taking an ounce of castor oil twenty-four hours previously, followed by an enema the morning of the examination.

HISTORY

It is well to begin by inquiring as to whether there has been any trouble with the rectum and to ask the subject to answer

a few concrete questions: How many bowel movements are there daily? Is the subject constipated, and is the condition increasing in severity? Was it of rapid onset? Does he have diarrhea? Does he suffer from piles? Does he pass pus or mucus? Does he suffer from severe itching? Does he have rectal pain or bleeding?

If any of these symptoms are present, the physician is warned that he may find pathology.

INSPECTION

Lying on his side, the subject is told to flex the upper leg and thigh. The physician should carefully inspect the perianal region after separating the buttocks, noting any swellings, fistulæ, erosions, thickening of the skin, skin tabs, or piles. If he next directs the subject to strain down as he would in moving the bowels, a better view of the lower end of the anal canal will be obtained, and fissures may come into view. Also, in this way, hemorrhoids, polyps, or a prolapse may be seen that might otherwise escape notice. If there is a history of prolapse and none is seen in the semiprone position, squatting with straining will likely bring the prolapse down.

Palpation.—Palpate the region about the anus, noting any swellings, areas of induration, or tenderness. Then very slowly introduce the index-finger (using a thin rubber finger-cot well lubricated) into the rectum, asking the subject to bear down at the same time. The physician should note the tonicity of the muscle, whether in spasm or not, and whether the examination is painful or not. He should determine the condition of the papillæ, feel for polyps, tumor or irregularities, and erosions in the mucous membrane. He should note the size and consistency of the prostate in men, and recognize the cervix in women. If the stool is hard, this should be noted.

Proctoscopic Examination.—With the subject in the knee-chest (not elbow) position, very gently introduce a well-lubricated proctoscope, pointing the instrument in the direction of the head. After it is in 5 to 7 cm., remove the obturator, attach the electric light, and examine the rectum proper by direct vision. It is well to use a 10-cm. proctoscope. Look at all the walls of the rectum, and as the instrument is with-

drawn through the anal canal have the subject bear down, so the extent of hemorrhoids (if there be any) may be better judged. Next introduce the 30-cm. proctoscope exactly as before. Under direct vision swing the outer end of the proctoscope from side to side to pass the sickle-like Houston valves. This simple procedure will carry the examiner easily to the rectosigmoid junction about 15 cm. from the anus. From here the examination may be more difficult. The tuber ischii may be so closely placed that it will be a mechanical impossibility to proceed far into the sigmoid, or a short mesentery of the sigmoid, or inflammation in or around the bowel may prevent further progress of the proctoscope. In any event the instrument should not be forced. Gentle inflation may make the bowel balloon out, so that the proctoscope can slip along easily for another 15 cm. Another 5 cm. may then be seen. The rectum and sigmoid should be inspected for polyps, tumors and ulcerations, or abnormalities of the mucous membrane. At times a feeling of resistance at the end of the proctoscope will give evidence of masses outside the bowel where there has been no alteration of the mucous membrane, that is, inflammation or tumors of the pelvis or carcinoma of a loop of the bowel higher up that has prolapsed into the pelvis.

Supplementary Investigations

Where the history indicates the possibility of disease of the large bowel, and if the proctoscopic examination is negative, then a barium enema should be given. All cases of bleeding, regardless of age, and all those suffering from increasing constipation, should have a proctoscopic examination before a gastro-intestinal *x*-ray series. Direct vision is far more accurate in examining the rectum than is the *x*-ray.

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LABORATORY METHODS AND STANDARDS

Section 17

SPECIAL TESTS—TECHNIC, INTERPRETATION, AND INDICATIONS FOR

Introduction by Mazyck P. Ravenel, M. D.

There is a disposition on the part of some clinicians to belittle the value of *x*-ray and laboratory investigation, and it is true that caution should be exercised in accepting such evidence—indeed, it is extremely important to avoid precipitant conclusions based upon laboratory data considered apart from other evidence.

No one, however, can question the value of these supplementary investigations if a proper sense of proportion is observed in considering the evidence elicited merely as a part of the whole clinical picture. For example, in cases presenting light weight, loss in weight, low blood-pressure, and persistent cough it would be hazardous to accept a negative *x*-ray study as justifying the absolute exclusion of the possibility of a tuberculous element in the case. It would be equally hazardous in such a case to accept negative findings on the physical examination as final without supplementary *x*-ray investigation. On the other hand, a doubtful *x*-ray plate would not, in the absence of other signs of a focus of activity in the lung, justify a dogmatic conclusion as to the presence of active tuberculosis. The whole picture must be considered, and in every instance the patient given the benefit of the doubt, not by giving him a clean bill of health, but by instituting a preventive and constructive regimen. When signs suggestive of either active tuberculosis or a favorable soil for tuberculosis are present, the wise clinician will not allow professional self-sufficiency to interfere with the welfare of his patient. He will utilize every resource at his command, and after assembling all the data, endeavor to form a well-balanced, final conclusion rather than to make a flashy "diagnosis" based upon supposed superior powers of intuition or broad clinical experience.

We have seen many instances where failure to carry through a complete systematic survey of the body has misled some highly qualified and experienced clinicians. There is, of course, a very definite limit to what can be learned positively from the general physical examination and the elementary and preliminary examinations of the urine and blood. Furthermore, in considering laboratory reports, whether on blood or urine, it must be borne in mind that wide variations may occur from the normal standards even in normal people, and judgment is required as to the necessity for repetition of tests and checking up of apparently significant deviations from the normal. For example, it has lately been stated by two investigators that the hemoglobin content of the blood may vary as much as 30 per cent. in twenty-four hours[1] depending on various factors affecting the normal organism. It should be understood, therefore, that in presenting tables of normal standards these are subject to qualification in individual cases, and where such findings suggest the possibility of important pathology they should be critically checked. This applies even to the finding of a positive Wassermann reaction.

It is also important to keep in mind that in the periodic health examination dealing, as a rule, with early changes of slight degree we lack uniformly reliable efficiency tests for the detection of these changes. Albumin and casts may be present in the urine for a considerable period before any efficiency test at our command will show any important reduction in the functional capacity of the kidney. Nevertheless, the fact that any one of the important organs may be seriously reduced in function without prominent symptoms recognizable by the individual or even on physical examination, justifies the precaution of applying such efficiency tests as we have in all cases where the integrity of the heart, the kidneys, or the lungs is open to question.

The laboratory is a modern development and its value has been abundantly proved. In its present stage of development it gives confirmation of many observations made by physicians. In some cases it interprets these clinical findings, and in others it corrects faulty observations. In many cases it is able to furnish the earliest and most exact knowledge of the condition

[1] In our experience the range has been less than 10 per cent.

of the subject and at a time when clinical observation will give no results whatsoever. For example, early and mild diabetes without clinical symptoms can be detected by an examination of the blood. What the layman would call a "tendency to diabetes" is detected before the condition produces serious harm. It is just this feature of laboratory work which so amply justifies periodic examinations for those who consider themselves in perfect health. Practically the same statement can be made of the various types of kidney disease. Diphtheria and streptococcus carriers are readily detected by culture when there is no clinical condition directing attention to the trouble.[1]

On the other hand, the laboratory should never be allowed to take the place of careful clinical study. Many of the great discoveries of the past were made by men who had no laboratory facilities comparable to those now found in every physician's office. These men had cultivated their senses and were exact observers. They had cultivated also the power of drawing conclusions from their observations. We need only mention that Oliver Wendell Holmes demonstrated the contagious nature of puerperal fever practically thirty years before the laboratory evidence was given. In diphtheria, Bright's disease, Hodgkin's disease, glanders, and the various fevers—conditions which would baffle the average physician of today—clinical observations which have proved to be exact were made without laboratory help. Too much dependence upon the laboratory leads to lack of development in the doctor himself. No better example can be found than the present use of the Wassermann test. Tragic blunders have been made by accepting results of these tests without carefully checking them against clinical observations and history.

In conformity with the preceding sections of this manual, the laboratory section has been written from the viewpoint of preventive medicine. Lengthy discussions have been avoided. The various tests which have been found useful in connection with periodic health examinations have been briefly described; also the indications for each test have been given and the interpretation of the results.

[1] See Appendix, p. 365.

Urine

Routine Analysis

Indications.—A routine urinalysis should be made on every person applying for examination regardless of whether or not symptoms are present. It should be repeated at least every six months in healthy individuals.

Description and Interpretation.—The examination consists of a description of the specimen—whether clear or turbid; color, etc.; specific gravity; reaction; tests for albumin and sugar (acetone and diacetic acid where sugar is found); and a microscopic examination of the sediment. The latter is obtained by centrifugalizing a portion of the specimen in a high-powered centrifuge. These tests constitute the essentials of the routine urinalysis.

Appearance.—A freshly voided or well-preserved specimen is amber in color and clear.

Reaction may be acid, neutral, slightly alkaline, or amphoteric.

Specific Gravity.—Even in a casual specimen the specific gravity is of considerable importance. A detailed explanation of its significance is found under Urine Concentration Test (see p. 206).

Albumin indicates some irritative, inflammatory, or degenerative process in the renal system, but in itself gives no idea as to the kidney's functional capacity. In renal arteriosclerosis, for instance, there may exist maximal renal insufficiency with little or no albumin in the urine. On the other hand, in so-called Epstein's nephrosis one may have a maximal quantity of albumin with very slight or no increase in the urea and other nitrogenous waste products of the blood. Albumin may also occur as a result of prostatic disease, spermatorrhea, leukorrhea, etc. It is necessary to determine its origin and estimate the functional capacity of the kidneys. White blood-cells or spermatozoa may occasionally explain the presence of albumin.

Sugar is not present normally in the urine except in such small amounts as to be undetectable by the methods usually employed for routine work. When present in large amounts sugar usually indicates a diabetic condition. In small amounts

it may be due to renal or alimentary glycosuria. The severity of a diabetic condition is not necessarily proportional to the quantity of sugar present. A positive sugar test should be followed by other analyses, and, if persistent, by blood-sugar determinations and perhaps a glucose tolerance test to determine the ability of the individual to utilize carbohydrate.

Indican when excessive, though perhaps suggesting intestinal putrefaction and stasis, has been found so unreliable as an index to these conditions and the tests for it so undependable that many physicians have disregarded it altogether.

Acetone and *diacetic acid,* although occurring in other conditions, are of greatest importance in diabetes mellitus. They indicate that there is incomplete oxidation of fats in the body. The fatty acids, β-hydroxybutyric acid and diacetic acid, with acetone, are often referred to collectively as the "acetone bodies." Their presence may or may not be compensated by the buffer substances of the blood. The plasma CO_2-combining power determination may be used to ascertain the presence or absence of acidosis (decreased alkaline reserve).

Microscopical examination of urine sediment is of the utmost importance. Casts are usually found where there is albumin of kidney origin. The most common type is the *hyaline cast.* Whereas these may appear temporarily in health, as during severe exertion, their constant presence signifies some continued source of kidney irritation or chronic kidney damage. When the process is more severe, *granular* and *epithelial,* and even *blood* and *pus casts* may be found. Coarsely granular and epithelial casts indicate a more acute type of inflammation than finely granular casts. All are of cellular origin. *Waxy casts* are occasionally found and are sometimes associated with amyloid degeneration of the kidney. *Cylindroids* differ from the hyaline casts morphologically, but are usually considered to have essentially the same significance.

Albumin and *casts* always indicate the necessity for further tests to estimate the functional capacity of the kidney. Of greatest value for this purpose are the urine concentration test and blood chemistry.

Leukocytes denote infection somewhere in the genito-urinary tract. It is important to determine their source—whether from the vagina, the prostate, the bladder, or the kidneys. This can

usually be done very readily with the aid of a catheter, or by special urological examination.

Erythrocytes when present may be the result of calculi, severe kidney irritation, essential hematuria, or of any condition where there is hemorrhage into the genito-urinary tract.

Epithelial cells are present to a greater or less extent in every specimen examined. When excessive in the urine of women they are frequently of vaginal origin. It is the consensus of opinion of various authorities that it is rarely possible to differentiate those of renal origin from those lining the remainder of the urinary tract.

Mucus in small quantity is normal. It may be increased in a catarrhal condition of any part of the mucous membrane lining the genito-urinary tract.

Crystals and various *precipitates* are frequently present in specimens with high specific gravities, especially during cold weather. Amorphous precipitates, such as urates and phosphates, are very frequently seen; the former appear in specimens that have become cold, giving the familiar brick-dust sediment; the latter in alkaline or neutral specimens, especially in those which have been allowed to decompose. Other amorphous material may be composed of bacteria and extraneous matter.

Urine Concentration Test

This test has been made practicable by the method worked out by Mosenthal, and is often referred to as the Mosenthal test.

Indications.—Suspected nephritis or renal impairment; unexplained polyuria, nocturia, or edema; any other symptoms suggestive of deficient renal excretion. This test gives indication of impaired renal function at a much earlier stage than the examination for nitrogen retention in the blood.

Description.—The subject is instructed to follow his usual habits in regard to food and drink on the day of the test, the only restriction being that no fluid be taken after the evening meal. The bladder is emptied at 8 A. M. and collections are made in separate containers at 10, 12, 2, 4, 7, and 10 during the day. All urine voided from 10 P. M. to 8 A. M. inclusive is placed in a single container. A record of all food and fluid

taken during the day is made by the subject and returned with the specimens to the laboratory.

Interpretation.—The specific gravity is an index of the concentration of solid materials—salt, urea, uric acid, ammonia, etc.—in solution in urine. It has been found that in advanced renal impairment (chronic diffuse nephritis, arteriosclerotic kidney) the kidney is unable to concentrate waste products; hence, the urine shows a constantly low specific gravity. The normal kidney excretes a urine which varies widely in concentration from time to time, depending upon degree of diuresis from water or other diuretic substances. Normally during a twenty-four-hour period in urine collected at two-hour intervals there should be a variation in specific gravity of at least 10 points between the highest and lowest readings. A fixed high specific gravity indicates the ingestion of too little fluid. A fixed low specific gravity shows the inability of the kidney to concentrate. As the test is carried out the night urine should show a specific gravity of 1.020 or above, and the night volume to the day volume should be in the proportion of about 1 to 4.[1] Night volume does not often exceed 400 c.c. normally, and usually is somewhat less. When impairment is present, more water must be excreted in order to eliminate properly. Consequently, the specific gravity is low, usually around 1.010 or 1.012, and the night volume is increased both relatively and absolutely. Experience has shown that if only one urine can be obtained with a high specific gravity (*i. e.*, above 1.020) there is usually a normal non-protein or urea nitrogen in the blood. In passive congestion of the kidney the output of fluid is usually small; the percentage of salt, low; of urea, high.

Further conclusions than simply those concerning the functional capacity of the kidney can be drawn from this test. Where urea excretion is normal one can learn the approximate amount of protein consumed by the individual in twenty-four hours by multiplying the urea of the urine by 3.

An adequate protein diet is 1 gram for each kilogram of body density. Thus a man of 60 kilograms (132 pounds)

[1] Exceptions to this rule of relative day and night volumes often occur. Undue diaphoresis, for example, will upset this ratio to an extreme degree. An increase of night volume is probably of greater significance.

would normally excrete approximately 10 grams of nitrogen, equivalent to about 21 grams of urea; 4 to 8 grams of salt daily are adequate for body needs and chlorid equilibrium. In adults both these substances are in equilibrium (*i. e.*, output equals intake).

Phenolsulphonephthalein Test

Indications.—This test is applicable to any individual presenting symptoms of impaired renal function.

Description.—One c.c. of the dye substance (phenolsulphonephthalein) is injected into the muscles and the urine collected for two hours at one-hour intervals. The percentage of dye excreted is then determined colorimetrically in the laboratory.

Interpretation.—This test merely indicates the dye excreting capacity of the kidney. Normally it has been found that the kidney will excrete about 60 per cent. of the amount injected in two hours' time. If a small percentage is eliminated one can infer that the ability of the kidney to excrete other substances is also impaired. Inability of the kidney to excrete the dye may be due to circulatory disturbance in the kidney—for example, passive congestion—as well as some form of nephritis. This test is being used less frequently than formerly to determine functional capacity of the kidney because it has been found that the urine concentration test and blood chemistry together give more reliable results. It has proved of great value to urologists where ureteral catheterization is employed to determine unilateral kidney impairment.

Examination of Stomach Contents

Indications.—Functional disorders: gastric neuroses, hyperacidity, indigestion; organic diseases: chronic cholelithiasis, chronic appendicitis, gastric or duodenal ulcer, neoplasm, etc. The test is of value in differential diagnosis of these various conditions.

Description.—An Ewald meal, consisting of two average-sized slices of toast, without butter, and one glass of water, is given on an empty stomach and the gastric contents expressed about forty-five minutes later by means of a large-sized stomach-tube. The fractional analysis, in which the contents following

the meal are removed at fifteen-minute or half-hour periods for two or more hours, has proved of considerable value in ascertaining the function of the stomach. However, it has not proved itself of sufficient value in life extension work to warrant its continued employment. Comparison of the results of the fractional analysis with the simple Ewald analysis indicates that the latter gives all the essential information, and is, therefore, preferable because of its simplicity.

The routine examination of stomach contents consists of a description of the specimen and a determination of the degree of free and combined hydrochloric acid, total acidity, and acid salts. Tests are also made for occult blood, bile and lactic acid, and a microscopic examination is made of the sediment.

Interpretation.—Quantity. When contents are withdrawn as described about 50 c.c. are usually recovered. Inability to obtain any material usually indicates hypermotility of the stomach, whereas when 150 to 200 c.c. are found in the stomach hypomotility is quite definitely indicated.

Odor.—Normally the odor is that of yeast from the ingested bread. Pathologically the odor may be sour or rancid due to the presence of organic acids, and sometimes putrid or fecal. Mucus is usually present in small quantity. If present in large quantity, it indicates a catarrhal condition of the stomach mucous membrane, or possibly may be due to swallowed sputum.

Color.—Normally the gastric contents are whitish, due to the presence of bread. The presence of bile imparts a yellow or green color. When blood is present a dark brown color is produced due to the formation of acid hematin.

Acidity.—Normally hydrochloric acid is present free, combined, and in salts. The amount is determined by titration and expressed in terms of the number of cubic centimeters of 0.1 N sodium hydroxid necessary to neutralize 100 c.c. of material. When titrated in this way normal values for free HCl lie between 20 and 40, and for total acidity, between 40 and 60. The combined hydrochloric acid (which may vary greatly in amount) and the organic salts and acid salts make up the difference between the free hydrochloric acid and the total acidity. Lactic acid occurs frequently in the absence of free hydrochloric acid. The absence of free HCl and the presence of lactic acid are frequently associated with malignancy, and although these

findings are by no means pathognomonic, such a possibility must always be borne in mind.

Blood may be due to trauma from the stomach-tube, bleeding from an ulcer, neoplasm, etc. A satisfactory explanation for its presence should always be obtained by subsequent investigation.

Bile is frequently found in stomach contents in small quantity as the result of regurgitation from the intestine, especially when the stomach is nearly empty. When not excessive it has little significance.

Microscopical Examination.—This usually shows the presence of starch granules, mucus, yeast, fat droplets, and a few epithelial cells. In the absence of free hydrochloric acid various bacteria, such as sarcinæ, Oppler-Boas bacilli, etc., are frequently found in the contents of the stomach. The Oppler-Boas bacilli are often associated with gastric malignancy.

Examination of Feces

Indications.—Any condition with symptoms referable to the gastro-intestinal tract; to determine the type of constipation present; to assist in the diagnosis of ulcer or neoplasm; to determine the degree of enzymatic activity. It occasionally becomes necessary to make more exhaustive studies of feces in research work, but for ordinary practice the above indications are sufficient.

Description.—Routine examination consists in noting color, consistency, reaction, the presence or absence of occult blood, and microscopical examination.

Interpretation.—Normally the *color* is brown or golden yellow; the *odor* is not especially offensive; the *consistency* varies from semisolid to soft formed. *Scybala* are small, hard masses of fecal material which have remained in the bowel too long and have become abnormally dry. Fluid stools occur in diarrhea. Various foods and drugs may change the color of the feces. With a milk diet the color is light. Bismuth, iron, and vegetables rich in chlorophyll may impart a dark color. Blood may produce a tarry appearance. Clay-colored stools result from the absence of bile-pigment when there is biliary obstruction, or perhaps from very excessive fat. Mucus does not occur in sufficient quantities normally to be observed macroscopically.

Reaction.—Normally this may be neutral, faintly alkaline, or faintly acid.

Examination for Occult Blood.—This is of value only when meat has been excluded from the diet for several days previous to the time of obtaining the specimen. It is of value in determining the presence or absence of hemorrhage somewhere along the gastro-intestinal tract, as may occur in gastric or duodenal ulcer, neoplasm, infestation with certain types of intestinal parasites, etc. A very minute quantity of blood is sufficient to give a positive reaction, so that a negative report may be taken definitely to exclude the presence of blood.

Microscopical Examination.—A small amount of mucus is normally present, and there are usually found food remnants, such as muscle-fibers, fibrous connective tissue, vegetable cells and spirals, and occasionally starch granules. The presence of undigested fibers may indicate insufficient peptic activity. Needle-like crystals of fatty acids and insoluble soaps are nearly always encountered on microscopical examination of the feces. Crystals are commonly found, especially triple phosphate, and occasionally calcium oxalate or calcium phosphate. Although for routine work microscopical examination for ova and most parasites may be made on cold fecal specimens, examination for the motile amebæ should be made on fresh, warm specimens. Differentiation of the encysted forms, however, may be made on cold specimens.

Bacteria.—Opinion is divided regarding the value of determining the various types of organisms present. Gram-negative bacilli usually predominate, and are not considered especially putrefactive. The Gram-positive bacillus aërogenes capsulatus and certain other putrefactive bacteria are considered undesirable. Attempts are frequently made to implant the Gram-positive bacillus acidophilus, the object being to prevent intestinal putrefaction. This can readily be done and the strain perpetuated. Experiments carried out by various investigators seem to indicate that even when the flora are successfully changed, putrefaction may not be decreased. This conclusion, however, was based for the most part on phenol and indican excretion which have been shown to be somewhat unreliable as an index of intestinal putrefaction.

Blood Chemistry

Determination of Blood-sugar

Indications.—All cases in which there is glycosuria or a history of glycosuria, or symptoms suggestive of hyperglycemia or of disturbed sugar metabolism; also in furunculosis, pruritus, etc. Because of the tendency of individuals to become obese in the prediabetic stage it is a valuable procedure in cases of overweight.

Description.—The test should be carried out not sooner than four hours after a meal, on oxalated blood. Before breakfast in the morning is a very good time for blood to be taken for this test. Following a meal the blood-sugar may go as high as 130 mgm. per 100 c.c. of blood under normal conditions.

Interpretation.—The normal figure for a fasting blood-sugar usually taken is from 80 to 110 mgm., with an average of 100 mgm. per 100 c.c.[1] A moderately high blood-sugar (*e. g.*, 140 mgm.) is often seen in chronic arthritis, in focal infections, and certain other conditions, but the chief value of this determination is in the diagnosis and observation of diabetes mellitus. The height of the blood-sugar is not always proportional to the severity of the diabetes. The concentration at which the kidneys begin to excrete sugar varies also in different individuals and at different times in the same individual. Certain cases of glycosuria (so-called "renal diabetes") continually excrete sugar with a normal concentration in the blood. Alimentary glycosuria may appear in a normal individual when the sugar gets above 160 mgm. or thereabouts. Diabetic subjects will often be sugar free at this level, but will show sugar in considerable amounts in the urine when the concentration goes over 200 mgm. The injection of insulin rapidly lowers the sugar in the blood, due

[1] In a recent article entitled "The Determination of Blood-sugar", by Stanley R. Benedict (Jour. Biol. Chem., May, 1925, pp. 207–213), the author reviews the subject of blood-sugar and produces experimental data indicating that these accepted standards are too high. A new method is proposed by him giving somewhat lower values, which there are good reasons to believe are more nearly true values. He now considers the normal to be between 65 and 90 mgm. per 100 c.c. This is virtually a reduction of 25 per cent. from the formerly accepted values.

both to the oxidation of sugar and to an increased storage function on the part of the liver and tissues.

Sugar Tolerance Test

Indications.—The chief value of this test is in a differential diagnosis between renal glycosuria and diabetes mellitus. It may also have some value in the study of certain endocrine disturbances, as in Addison's disease, hypothyroidism, hyperthyroidism, etc.

Description.[1]—The subject arrives without breakfast about 9 A. M. Control specimens of blood and urine are taken. Glucose is then administered by mouth in 50 per cent. solution to the extent of 1.75 gm. per kilo body weight. One-half hour later, and again at one and one-half and two and one-half hours, blood and urine specimens are taken. All specimens are then analyzed for sugar, the urine sugar being reported in percentage and grams for each specimen. The renal threshold is thus determined and the type of blood-sugar curve can be graphically represented.

Interpretation.—When the test is carried out in this manner the curve normally reaches its fastigium at about the end of one hour, then declines, until at the end of the second hour it is somewhere near the original or fasting figure. At times it may fall considerably below the first figure, probably due to a marked stimulation of pancreatic activity with excessive output of insulin. Undue hypoglycemia has thus been produced experimentally with all the symptoms of "hypoglycemic shock" such as are experienced when an uncompensated dose of insulin is given. Under normal conditions the blood-sugar will not go above 160 mgm. per 100 c.c. (rarely above 140 mgm.) and the urine will be free from sugar. The cause of glycosuria in "renal diabetes" is due to a renal threshold point below the level of the normal blood-sugar; during the increasing concentration of sugar in the blood after glucose ingestion the rate of output of sugar in the urine does not increase proportionately, but may remain more or less constant. In diabetes, on the contrary, there usually results an enormous output of glucose with a marked and prolonged increase of blood-sugar. Mild

[1] There are wide variations in the way this test is performed by various investigators. The general scheme is the same.

cases of diabetes usually have a nearly normal threshold (about 160 to 180 mgm.), but since the blood-sugar markedly exceeds this, generally going to 200 mgm. or over, the urine output is excessive. The threshold point in uncontrolled cases of diabetes tends constantly upward.

Determination of Uric Acid

Indications.—Suspected gout, arthritis, neuritis, myalgia, suspected renal impairment—especially the early stages—focal infections, etc.

Description.—Blood should be taken after a fast of several hours, preferably in the morning before breakfast.

Interpretation.—Normal quantity is from 1.5 to 4 mgm. in 100 c.c. of blood. As it is one of the most difficult waste products for the kidney to eliminate, it becomes one of the first to be retained in kidney impairment; hence, its retention is looked for as an early sign of renal insufficiency. It also appears to be rather constantly increased when there are chronic foci of infection. In gout it assumes a rôle of greatest importance and is almost invariably markedly increased, frequently reaching several times the normal amount. It is possible that certain so-called rheumatic manifestations may be due to increased uric acid. At all events, an increase is frequently associated with such symptoms, though whether it bears a causal relationship or is merely coincidental is an unsettled question.

The writer is of the opinion that, as practical diagnostic evidence, uric acid has been "weighed in the balance and found wanting." It should never in itself be taken as conclusive evidence of anything, but should cautiously be evaluated in the light of other chemical findings and the clinical picture.

Non-protein Nitrogen

Indications.—Suspected renal impairment and, in nephritis, to determine the degree of retention in the blood. This test gives practically the same information as the urea nitrogen test, but is of greater value in cases of nephritic toxemias of pregnancy.

Description.—Blood should be taken after several hours' fast, best in the morning before breakfast.

Interpretation.—Normally there are between 25 and 35 mgm. present in the blood. Except in nephritic toxemias of pregnancy the urea nitrogen of the blood gives practically the same information concerning the state of the kidneys as does the non-protein nitrogen. In nephritic toxemias the urea is frequently normal, with greatly increased non-protein nitrogen. Normally the urea nitrogen constitutes from 40 to 50 per cent. of the non-protein nitrogen, though where there is an increase of non-protein nitrogen due to impaired kidney function this percentage is usually considerably increased. About 46 per cent. of the normal non-protein nitrogen of the blood is still of undetermined origin.

Determination of Urea Nitrogen

Indications and Description.—Same as for non-protein nitrogen.

Interpretation.—This substance is of both endogenous and exogenous origin and is formed in the liver. Normally there may be from 9 to 18 mgm. present in 100 c.c. of blood. Any figure over 16 mgm., however, should be looked upon as suggestive of impairment in kidney function, unless the specimen of blood has been taken shortly after a meal rich in protein. Urea nitrogen is more easily eliminated than uric acid, but less so than creatinin. In nephritis, uric acid is retained earliest, urea next, creatinin only in an advanced stage of kidney disease.

Determination of Creatinin

Indications.—This test should always be performed when the non-protein nitrogen or urea nitrogen is increased above the normal. It is of no value in the detection of early kidney impairment.

Description.—The conditions under which the blood should be taken are the same as for the other substances, but previous food has less influence on this test than on those above mentioned, as it is almost entirely of endogenous origin.

Interpretation.—This substance has its origin in the creatin of muscle tissue. It is normally present in amounts varying between 1 and 2 mgm. in 100 c.c. and has its greatest value in the prognosis of renal conditions. Since it is one of the

waste products which the kidney can most easily eliminate, its retention in the blood indicates a marked degree of renal insufficiency with a very grave prognosis. In a large series of cases Myers showed that patients having 5 mgm. or more rarely survive for more than a year.

Determination of Cholesterol

Indications.—Nephrosis, lipemia, xanthoma diabeticorum.

Description.—This is performed on oxalated blood taken under the same conditions as previously stated.

Interpretation.—The normal amount is from 150 to 180 mgm. per 100 c.c. of blood. Although of considerable interest, it has not proved of very great practical significance. It is frequently found increased in diabetes mellitus, especially where a lipemia is present, and has considerable value in the diagnosis of Epstein's nephrosis, in which it is almost invariably increased.

Determination of Sodium Chlorid

Indications.—Nephritis, edema from any cause, anasarca, alkalosis, hypertension.

Description.—Best performed on whole blood, although many workers prefer to make this determination on plasma. Plasma figures are apt to be rather misleading, because after the blood is drawn there results a shifting of chlorids from cells to plasma, thereby materially increasing the plasma figure. This shifting is due to the escape of CO_2 from the blood and invariably occurs unless steps are taken to prevent its escape.

Interpretation.—The normal values are from 450 to 500 mgm. per 100 c.c. for whole blood and from 560 to 620 mgm. for plasma. Sodium chlorid may be increased in any form of renal insufficiency. In Epstein's nephrosis and passive congestion of the kidney chlorids are poorly eliminated. In anasarca the increase of chlorids in the blood may be considerable. There is usually a considerable decrease following poisoning with mercuric chlorid. An elevation occasionally accompanies localized edema. Although there have been attempts in recent years by certain investigators to link increased chlorids of the blood with essential hypertension, it

is very doubtful if there is any relationship between them, as normal figures are invariably found where hypertension is not complicated with renal insufficiency or cardiac failure. A marked decrease occurs in alkalosis accompanying intestinal obstruction and the determination is of great value in the treatment of this condition. Experimentally blood chlorids also diminish following hypodermic injections of histamine.

Determination of Carbon Dioxid Combining Power

Indications.—Suspected acidosis or alkalosis from any cause, whether of diabetic, nephritic, gastro-intestinal, or other origin.

Description.—Plasma is separated from oxalated blood in the centrifuge, placed in a separatory funnel, and brought in contact with alveolar air at normal alveolar CO_2 tension (*i. e.*, 5.5 per cent. CO_2). After being brought into equilibrium 1 c.c. of the plasma is placed in the gas buret of Van Slyke, the CO_2 liberated by means of a fixed acid, and the amount of CO_2 combined with the plasma under these conditions is then calculated, and the figure corrected for temperature and barometric pressure.

Interpretation.—Normally blood-plasma will combine with 55 to 70 volumes per cent. of CO_2 at normal alveolar tension of 5.5 per cent. When any condition exists which robs the body of alkali, this ability of the plasma to combine with CO_2 is decreased. The substances which most frequently interfere in this way are the acetone bodies in diabetes mellitus and the acid phosphates in advanced nephritis. Either condition is known as acidosis. The estimation of the CO_2 combining power of the plasma, therefore, becomes indirectly an index of the amount of acidosis present. Since patients suffering from acidosis usually show marked clinical signs and are rarely ambulatory, this is not frequently employed in life extension work. However, it is occasionally of value to the ambulatory patient, especially where there is evidence of advanced renal insufficiency or where acetone is present in the urine. Other types of acidosis scarcely need discussion in this connection. A marked increase in CO_2-combining power is found in alkalosis together with an increased pH of the blood.

Icterus Index[1]

Indications.—Visible icterus, suspected latent icterus (*i. e.*, increase of bile-pigment in the blood without visible icterus).

Description.—In this test the blood-serum is merely compared in a colorimeter with an arbitrary standard (potassium dichromate, 1 : 10,000) which accurately matches the color of bilirubin. The calculation is, reading of standard divided by reading of serum. For example: If when the standard is set at 15 mm. the serum reads 5 mm., the index is 3. Normally the index is from 3 to 6. Between 6 and 15 a latent jaundice (a condition in which there is no discoloration of the skin and no excretion of bile-pigment in the urine) is present. Clinical jaundice is present where the icterus index reaches 15 or more, but rarely under 15.

Interpretation.—Bilirubin is formed both by certain hepatic cells and also extrahepatically by the reticulo-endothelial cells of the spleen and possibly of other organs. Its precursor is hemoglobin. It is eliminated by the liver cells into the bile. Increased blood destruction, impaired liver function or biliary obstruction causes it to increase in the blood, where it must be present to four to five times the normal amount before clinical jaundice ensues. The test indicates the pre-jaundice stage. When clinical jaundice is present bilirubin may fall markedly in the blood several days before there is any appreciable change in the appearance of the subject. The test, therefore, gives accurate information of what the liver is doing long before there are clinical signs. In non-hemolytic icterus the icterus index gives practically the same information as the phenoltetrachlorphthalein test, since the elimination of bilirubin depends upon the functional integrity of the liver. It has been found, however, by careful comparison to be much more sensitive to changes in function than is the artificial dye test. In hemolytic conditions the index is also increased. It therefore becomes necessary to determine whether or not the icterus is of the obstructive or non-obstructive type. This information can be obtained by the van den Bergh test.

[1] For further information see Bernheim, Jour. Amer. Med. Assoc., January 26, 1924, p. 291.

van den Bergh's Reaction[1]

Indications.—Any condition in which there is increased bilirubin in the blood to determine its source, whether of obstructive or non-obstructive origin ("hepatogenous or hematogenous").

Description and Interpretation.—Bilirubin is normally present in blood in a concentration of about 1 part to 400,000; visible jaundice occurs only when this is increased to about 1 part in 50,000. At about the latter concentration bilirubin begins to be excreted through the kidneys. van den Bergh's test will react positively at somewhere near the latter concentration. There are two parts of the test, the *direct* and the *indirect* reactions.

Direct: To 1 c.c. of serum add 0.25 c.c. Ehrlich's diazo reagent. In positive cases a violet or pink color is produced due to the formation of azo-bilirubin. This test becomes positive only in obstructive jaundice. In non-obstructive jaundice this test is negative; also, of course, where no hyperbilirubinemia is present.

Indirect: One c.c. of serum is added to 2 c.c. of 95 per cent. alcohol and centrifugalized, throwing down the protein precipitate; to 1 c.c. of the supernatant fluid 0.25 c.c. Ehrlich's diazo reagent is added. A violet color indicates a positive result. This test is positive in both types of jaundice—obstructive and non-obstructive. If, therefore, a negative result is obtained with the direct test and a positive result with the indirect, we may know that we are dealing with a non-obstructive type of jaundice.

There is apparently some change in the chemical character of the bilirubin brought about by the bile-secreting cells of the liver as it passes into the biliary system. Thus only can the peculiarities of the van den Bergh test be accounted for.

Fouchet Test

Indications.—Increase of bilirubin in the blood, as indicated by the icterus index test.

[1] For further information concerning this reaction see MacNee, Quart. Jour. Med., July, 1923, p. 390; Friedman and Straus, Jour. Amer. Med. Assoc., April 19, 1924, p. 1248.

Description.—This is a specific test for bilirubin and reacts when the concentration is 1 to 60,000 or greater. A few drops of Fouchet's reagent are mixed with an equal amount of serum on a white porcelain surface. Oxidation of the bilirubin results and a green color is produced.

Interpretation.—This test is of value for confirmation, proving the presence of bilirubin.

Phenoltetrachlorphthalein Test for Liver Function[1]

Indications.—Any condition in which there is thought to be impairment of liver function, *e. g.*, neoplasm, syphilis, obstruction, cirrhosis, parasitic infection, hepatitis, etc.

Description.—The principle consists of the injection into the blood-stream of a dye which is eliminated by the liver. As it is removed from the blood it is discharged through the bile passages into the duodenum.

Interpretation.—At the end of one hour the dye should be entirely absent from the blood. The presence of over 5 per cent. at the end of one hour can be interpreted as showing definitely impaired liver function.

Cytology[2]

Erythrocyte Count

Indications.—Anemia, whether primary or secondary; suspected polycythemia.

[1] For literature describing the test and results obtained in more detail see Rosenthal: A New Method of Testing Liver Function with Phenoltetrachlorphthalein, Jour. Amer. Med. Assoc., December 23, 1922, p. 2151.

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[2] Space does not permit an exhaustive discussion of all the information which may be obtained by a study of the blood-cells. For more complete information the reader is advised to consult any standard work on clinical pathology.

Description.—Blood is drawn from the finger or ear, care being taken that the blood flows freely from the needle puncture and that pressure is not exerted near the point of puncture, as this causes dilution by the tissue fluids. The blood is drawn into a red cell counting pipet and diluted 1 to 200 with Hayem's solution. After thorough mixing a drop is placed upon the counting chamber, care being taken to obtain an even distribution of cells over its surface. A count of 100 small squares is then made and the result calculated.

Interpretation.—Normal figures for erythrocytes in the adult male average 5,000,000; in the adult female, 4,500,000. These figures may fluctuate considerably for different hours during the day.[1] That this is not merely an expression of simple dilution of the blood seems probable from the fact that the hemoglobin does not vary to the same degree at the same time. Counts below 4,500,000 in the male or below 4,000,000 in the female indicate the presence of anemia. Anything over 6,000,000 may be considered a polycythemia. Red cell counts alone cannot be relied on to distinguish between the various forms of anemia.

Leukocyte Count

Indications.—Anemia; to show the presence of acute infection; to distinguish between the various types of acute infection; to aid in the differential diagnosis of various conditions.

Description.—The determination is made in the same way as that for erythrocytes, except that the dilution made is 1 : 20 instead of 1 : 200, and 5 per cent. acetic acid is used as the diluting fluid. The count usually includes an area of 4 to 6 square millimeters. The result is then calculated.

Interpretation.—The normal figure is from 6000 to 8000, with an average of about 7000. This may also vary to a considerable extent under normal conditions, an increase frequently being observed after meals. In a differential count of the leukocytes the following figures may be taken as the average under normal conditions:

[1] A maximum variation of 10 per cent. has been observed by the writer.

	Per cent.
Polynuclear neutrophils	65–75
Lymphocytes	20–30
Endotheliocytes (large mononuclears)	5–8
Eosinophils	2–4
Basophils	0.5

Leukocytes are increased in most, though not all, acute infections. In scarlet fever they are usually between 20,000 and 50,000 in the early stages. In pneumonia of the lobar type figures as high as 30,000 or higher may be observed. In acute suppurative conditions figures of 15,000 or above are frequently seen. Leukopenia usually occurs in the following conditions: Influenza, typhoid fever, malaria, tuberculosis, pernicious anemia, aplastic anemia, and measles.

The proportion of neutrophils is usually increased in the acute suppurative conditions and relatively diminished in the cases showing leukopenia. A lymphocytosis is normal in children. A relative lymphocytosis occurs frequently in pernicious anemia, typhoid fever, malaria, tuberculosis, and measles. The proportion of the eosinophils is increased in most cases of infestation with animal parasites. Myelocytes are most commonly seen in splenomyelogenous leukemia. They may occur in certain other conditions, but in much smaller numbers.

Platelet Count

Indications.—Purpura hæmorrhagica; aplastic anemia; pernicious anemia; delayed clotting time of the blood.

Description.—Various forms of technic have been recommended for this determination. One of the most common methods is to count the platelets and the red cells in a number of fields. The number of red cells being known, the platelets can be computed. This is the most inaccurate method, due to the fact that platelets tend to clump together when a smear is made, and may be found in large numbers in one spot, while other portions of the smear are comparatively free from them. The use of a diluting fluid and a direct count is a more accurate method.

Interpretation.—The number varies considerably. Normal figures are given as 226,000 to 367,000. Rarely, however, do

they go below 300,000 under normal conditions. They are of chief value in the study of aplastic anemia and purpura hæmorrhagica, as in both conditions they are always materially decreased. The lowest figures are seen in the latter condition.

Examination of Blood Smears

Indications.—Anemia, malaria, filariasis, lead-poisoning, differential leukocyte counts.

Description.—Smears are best made on microscopical slides, care being taken to obtain as even a distribution of the cells as possible. Wright's stain or MacNeal's tetrachrome stain probably give the best results. Average size, shape, and staining properties of the red cells are noted. A rough estimate of the number of platelets present can also be given by one experienced in the examination of smears.

Interpretation.—In pernicious anemia, poikilocytosis and anisocytosis are common characteristics. Ovalocytes, macrocytes, microcytes, polychromasia, erythroblasts, and eosinophilia are all found at some stage of the disease. Secondary anemias may show some of these characteristics, but unless very severe, poikilocytosis and anisocytosis are not marked; ovalocytes do not occur and polychromasia is rare, due to the low color index in most secondary anemias; doughnut-shaped forms are more common. In splenomyelogenous leukemia the picture is that of a secondary anemia together with large numbers of myelocytes which dominate the picture; in lymphatic leukemia large and small lymphocytes predominate. In both these conditions the leukocytes may run into the hundred thousands, though remissions are common. In examination for malaria or other parasites a stained smear usually is sufficient. A very thick dried smear from which the hemoglobin has been removed is of special value for malaria, since the parasites are much more apt to be found by this method when they are few in number.

Determination of Hemoglobin

Indications.—Hemoglobin determinations should be included in every health examination and especially where signs of anemia are present.

Description.—Many are the methods devised for the estimation of hemoglobin. Some of these methods—as the Dare, von Fleischl, and Tallqvist—are merely comparisons of the amount of red coloring-matter present to known standards.

In the Sahli and Newcomer methods the hemoglobin is first converted to acid hematin with 0.1 N HCl, and the yellow color produced compared with the standard. An indirect method for determining hemoglobin is the determination of the oxygen-carrying capacity of the blood. This is a very accurate method, but impracticable for routine work. Perhaps the most satisfactory method at present available for hemoglobin determinations having a high degree of accuracy is that of Newcomer.

A glass disk which has the identical light absorption as acid hematin is used for the standard. The colorimeter is based upon the Dubosq principle. This instrument[1] has proved highly satisfactory in many thousand determinations. The advantages of this instrument are its accuracy and the rapidity with which determinations can be made.

Various laboratories have disagreed materially in the results of hemoglobin estimations, due to the employment of different standards. It would seem that the figures of Williamson are based upon the most thorough and careful determinations at present available. Williamson gives 16.92 grams per 100 c.c. as the average amount for a normal adult male, and 15.53 grams as the average for a normal adult female. It will be seen from these figures that the female value is 92 per cent. of the male value.

Interpretation.—In a recent article[2] two investigators have stated, on the basis of the work done by them, that the hemoglobin may vary at different times during the day as much as 30 per cent.[3]

[1] Made by Bausch & Lomb, Rochester, New York.

[2] Rabinowitch, I. M., and Strean, G.: Hemoglobin Content of the Red Blood-cells in Relation to Their Surface Area, Arch. Int. Med., July, 1924, p. 124.

[3] Experiments carried out at the Life Extension Institute have demonstrated some variations, but all have been under 10 per cent. In these unpublished experiments it was found that red cell counts and hemoglobin determinations did not always vary in the same direction or to the same

In any form of anemia hemoglobin is decreased, the lowest percentages being found in pernicious anemia. Here they sometimes go as low as 20 per cent. of the normal, or less. In severe secondary anemia low figures are also observed.

Color Index

Indications.—This is calculated whenever red cells and hemoglobin are both determined. It aids materially in the differential diagnosis of the various anemias.

Description.—The color index is determined by dividing the percentage of hemoglobin by the percentage of red cells. Theoretically, under normal conditions each being 100 per cent., the color index should be one. It is customary to consider 5,000,000 as being the average normal figure for the adult male and 4,500,000 for the adult female.

Interpretation.—The color index is almost invariably high in pernicious anemia—usually over 1. In chlorosis and secondary anemia, on the contrary, it is usually low, frequently as low as 0.5 or less.

Coagulation Time

Indications.—History of undue bleeding from small wounds; clinical icterus; as a precautionary measure before operation.

Description.—Several methods have been devised. The use of small capillary tubes for this purpose is satisfactory. The blood is obtained from a needle puncture and allowed to flow into a small capillary tube. It is then kept in an even temperature in a fold of the hand and observed until it no longer flows readily. Pieces of it are then broken off and the time required for the formation of the clot is determined.

Interpretation.—This is normally between four and seven minutes. A period of over ten minutes shows definitely delayed clotting time.

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extent. A probable explanation of this is that the spleen is stimulated to contract during anoxemia, giving an added increment of hemoglobin to the cells. See comment and reference in Jour. Amer. Med. Assoc., May 23, 1925, p. 1576, "When the Spleen May Become Useful."

Bacteriology

Examination of Sputum

Indications.—Clinical evidence of repiratory infection, such as cough, loss of weight with low blood-pressure, fever, etc.

Description.—Sputum is collected in a sterilized wide-mouthed bottle. The patient is instructed to cough up vigorously and to obtain if possible only that which comes from the lungs. If tuberculosis is suspected, a number of such specimens should be examined—three taken at two-day intervals being a satisfactory procedure.

Careful note is made of the gross appearance of the specimen, followed by the differential staining and microscopical examination. Occasionally it becomes necessary to resort to guinea-pig inoculation for tuberculosis and to mouse inoculation for pneumonia. These special examinations, however, are rarely required in life extension work.

Interpretation.—The finding of one or more tubercle bacilli in a smear is *prima facie* evidence of tuberculosis. Tenacious sputum, bronchial casts, eosinophils, Charcot-Leyden crystals, and Curschmann's spirals are frequently found in asthma. Pneumococci, though found in greatest numbers in pneumonia, are nevertheless frequently seen under normal conditions. This is true also of staphylococci, streptococci, and micrococci catarrhalis. In any acute respiratory infection leukocytes are usually present in large numbers together with large numbers of micro-organisms.

Prostatic Smear

Indications.—Prostatic enlargement; history of gonorrhea; constitutional evidence of focal infection; unexplained pus in the urine.

Description.—Material is obtained by massaging the prostate, smeared on a glass slide, stained by Gram's method, and examined.

Interpretation.—The presence of gonococci shows the presence of a gonorrheal infection. Pus cells and other organisms indicate prostatic infection which may be latent, but, nevertheless, must be considered a menace to the individual's health.

Vaginal and Cervical Smears

Indications.—Purulent discharge; history of gonorrhea; constitutional evidence of focal infection; signs of local inflammation.

Description.—The smear is obtained by the aid of a speculum and examined in the same manner as the prostatic smear.

Interpretation.—The vagina under normal conditions is the habitat of a large number of micro-organisms. Unless there is clinical evidence of infection, these may be disregarded. An excessive amount of mucus and pus indicates the presence of an inflammatory condition—usually an endocervicitis which requires special treatment. The presence of gonococci without clinical symptoms indicates a latent infection which may be a menace to the individual or others.

Tonsil Culture

Indications.—History of tonsillitis; evidence of disease in the tonsils; constitutional evidence of focal infection.

Description.—Material is taken from the tonsil on a sterile platinum loop, care being taken to enter the crypts, and smeared on a plain agar slant. This is incubated overnight and the culture transplanted to a blood-agar plate. After incubation the colonies are described and their hemolytic properties mentioned. They are then transferred to a slide for microscopic examination.

Interpretation.—Tonsil cultures have proved of value in demonstrating to a subject the presence of virulent micro-organisms in the tonsils. On the strength of this evidence he will often seek to obtain the necessary treatment where other methods of persuasion fail.

Blood-cultures

Indications.—Clinical evidence of bacteremia, *e. g.*, petechial spots, signs of endocarditis, typhoid fever, fulminating infections, etc.

Description.—About 10 c.c. of blood are taken under sterile conditions by venipuncture, mixed with plain agar, and incubated. With bacteremia, growth is usually evident at the end

of forty-eight hours. If no growth is evident at the end of seventy-two hours the blood may be considered sterile.

Interpretation.—Provided there has been no contamination, a growth of organisms is evidence of bacteremia. Ordinarily, patients with bacteremia are too sick to be ambulatory. Hence, this examination is seldom required in life extension work.

Examination for Spirochetes

Indications.—The presence of any lesion suggestive of a syphilitic chancre.

Description.—Material is obtained from the sore by pressure and careful scratching of the surface, care being exercised not to cause bleeding. This is mixed with a little physiological salt solution, placed upon a slide, covered with a cover-glass, sealed to prevent drying, and examined microscopically with the dark-field illumination.

Interpretation.—The presence of the characteristic spirals is evidence of syphilis.

Serology

Wassermann Test

Indications.—History of venereal disease, including gonorrhea and chancroid; suspicious-looking skin lesions; mucous patches; presence of ataxia, positive Romberg test, fixed pupils or other signs of involvement of the central nervous system; hypertension; undue arteriosclerosis; general lymph-gland hypertrophy; unexplained enlargement of liver, etc.

Description.—As carried out in most laboratories, the ice-box fixation method is now generally employed. Several antigens should be used in each test for comparative purposes, including one or more of both alcoholic and cholesterolized. The fixation is performed by placing in the ice-box for four hours. Sensitized cells are finally added. The Citron method of reading the tubes is very satisfactory.

Interpretation.—When the above technic is carried out an occasional negative alcoholic and plus-minus cholesterol result will be obtained on non-syphilitic sera, especially in those cases having a positive history of gonorrhea.[1] Dr. Archibald McNeil

[1] This has been observed in a large number of cases.

has observed a somewhat stronger binding with the cholesterolized antigen in the presence of other infections.

A test giving a negative result with the alcoholic antigen even with some fixation with a cholesterolized antigen should hardly be considered conclusive as to the presence of syphilis. On the other hand, even a slight fixation with the alcoholic antigen is worthy of serious consideration. A result showing a weaker fixation with the cholesterolized antigen than with the alcoholic is usually due to faulty technic. The cholesterolized result should be as strong or stronger than that with the alcoholic antigen, since the cholesterolized antigen is more sensitive. The interpretation of symbols usually employed is as follows:

Four-plus—very strongly positive.
Three-plus—strongly positive.
Two-plus—positive.
One-plus—weakly positive.
Plus-minus—doubtful.
Minus—negative.

In the presence of symptoms suggestive of organic disease of the central nervous system a study of the spinal fluid should be made, even in the presence of a negative blood Wassermann. This should also be done where there is a doubtful or weakly positive blood Wassermann (alcoholic antigen) without symptoms.

Gonorrheal Fixation Test

Indications.—Arthritis clinically suggestive of gonorrheal origin; chronic urethral discharge; when the prostatic smear shows the presence of organisms. (In the absence of a gonorrheal history it is usually hardly worth while to make this test.)

Description.—The technic is very similar to that of the Wassermann test, one specific antigen only being employed.

Interpretation.—Anything but an absolute negative should be looked upon as very suggestive, since a weak result with this test is considered much more significant than a corresponding result in a Wassermann test. A strongly positive result may be considered conclusive evidence, and it is the

consensus of opinion that even a one-plus result is not obtained except in the presence of a gonorrheal infection.

Basal Metabolism Test

Indications.—Symptoms of hyperthyroidism: loss of weight, nervousness, tremor, exophthalmos, paroxysmal sweating, weakness, increased appetite, tachycardia, struma, etc.

Symptoms of hypothyroidism: increased weight, sluggishness, bradycardia, myxedema, loss of hair, etc. The test is of great value in differentiating between hyperthyroidism and neurosis, and between hypothyroidism and obesity from other causes.

Description.—Basal metabolism is the determination of the heat production of the body when at complete rest. It can be determined either directly by calorimetry or indirectly by gas analysis and computation of the amount of oxygen absorbed for a given time. This is then compared with the normal for a person of the same weight and height. The test has been simplified by assuming a certain respiratory quotient, since this is fairly constant when the individual is on a mixed diet. It then becomes only necessary to determine the amount of oxygen consumed for a given length of time and to compare this with the normal.

Interpretation.—In the present state of our knowledge an increase of the basal metabolic rate is *prima facie* evidence of increased activity of the thyroid gland. So far as is known, the thyroid is the one gland capable of increasing metabolic rate, though possibly at times the suprarenal may play a similar rôle. For practical purposes, however, an increase in the rate should be charged against the thyroid. It is becoming the consensus of opinion that the symptom complex known as exophthalmic goiter is not simply and purely a hyperthyroidism, although the thyroid is obviously at fault. Typical symptoms of this condition often fail to be produced by the simple feeding of thyroid extract. The symptoms which are produced by thyroid feeding are more similar to those of a thyroid adenoma, in which condition thyroxin is normal in nature, but increased in amount. It is probable that in exophthalmic goiter the substance elaborated either wholly or in part by the thyroid gland differs from normal

thyroid extract and has more toxic properties. This condition has been termed "dysthyroidism."

As an increased metabolic rate is indicative of hyperthyroidism, so a decrease below the normal limits indicates hypothyroidism. Most cases of obesity have a normal basal metabolic rate.

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COUNSELLING

Section 18

ESSENTIAL POINTS TO COVER IN REPORTING TO EXAMINEE

The periodic health examination in itself is of limited value unless in his report the subject receives sound counsel based upon the history, physical findings, and the supplementary investigations. It is true that even in the absence of counsel regarding minor defects or potential impairments, the bringing to light of defects and menacing conditions, which must occur in a large percentage of cases, has a high protective value; but the constructive possibilities of the health examination are lost if counsel is not given that will lead to corrective work and the upbuilding of health. The "periodic health examination service" would be a more accurate term to describe the procedure.

It has been noted by medical men in this field of work that people seeking this type of service appreciate a detailed written report when advice covering only minor impairments and counsel regarding hygienic matters is required, as well as where definitely advanced pathological conditions exist. It has been truthfully said that the periodic health examination movement is, in the broadest sense, the greatest advance that has been made in general prophylactic medicine in recent times. When it is looked upon in this light, the physician will appreciate the great importance of bringing to the attention of the examinee minor impairments which, if not corrected, may ultimately lead to serious pathological states.

The principles governing the counsel are fundamentally the same wherever it may be given, but the mechanism will vary, depending on whether the advice given is verbal or written, and whether it is given by the general practitioner who also makes the examination, or in a center where the data derived from the medical examination and the laboratory work are integrated and interpreted by special medical reviewers.

However, under whatever auspices the counsel may be given, the following general principles should be observed:

Verbal Reports.—While a formal written report is desirable, verbal counsel may be sufficient in some cases. In some departments of the periodic health examination service, especially in industrial work, it has been found quite satisfactory for the physician to advise the examinee at the close of the examination, explaining the nature of the impairments found and the type of medical treatment to be sought, at the same time furnishing the subject a brief itemized written summary of the findings, together with counsel as to needed corrections in hygiene and special educational leaflets adapted to the needs of the individual. This verbal method of reporting, supplemented by a brief written summary of advice, suggests the lines along which the service would, as a rule, be rendered by the general practitioner.

Physicians who undertake to do this work should supply themselves with health literature and leaflets that will amplify the verbal counsel given. The difficulty of presenting comprehensive educational messages in the brief space of a personal consultation is apparent. There must be material which the examinee can study at his leisure. In addition to leaflets on diet and exercise it is useful and important to mention books on personal hygiene which the individual can study with profit to himself. Haphazard, impulsive counsel on different phases of hygiene, derived from undigested, casual observation, should be avoided. Instead there should be a careful weighing of the consensus of scientific judgment and the ascertained experience that is available from various scientific sources.

The hazards of this work in clinical practice relate particularly to the inadequate counsel that may be given on matters of personal hygiene, inasmuch as this lies in the field of preclinical rather than clinical medicine. There is danger of the physician compromising with the individual, and if no serious impairment is found, endorsing at least tacitly his infractions of hygienic laws. If this work is to mean anything in a constructive way, the physician must be firm in such matters, without adopting an antagonistic or faddist attitude. He must also be careful not to be misled by the little apparent injury the individual has sustained from these infractions of

the laws of hygiene. The injury from such sources is often slowly cumulative, and the physician must forecast the future of the individual and endeavor to visualize what many years of such indulgences may do.

On the other hand, it is always desirable to guard against the danger of the examinee absorbing such information to the exclusion of positive suggestion for medical or surgical attention. It is highly important to emphasize the fact that the most ideal program of personal hygiene may fail if the necessary dental, surgical, or medical treatment is not also carried out. At the same time, such treatment alone may fail if the faults in living are not corrected.

Where the general practitioner does this work and assumes responsibility for carrying out the corrective measures, in his own protection he must not be too dogmatic in his preliminary interpretation of the findings. He should keep it in mind that he may have to modify his counsel after the results of special tests and laboratory investigations are known. For example, where examination of the urine and blood shows the presence of diabetes, special dietetic measures would have to be instituted. The detection of this condition would only be possible after the reports on laboratory investigations had been made available.

The physician should also bear in mind that the blood-pressure, the pulse, and tendon reflexes may vary from time to time; that the excitement incident to the examination may alone be sufficient cause for temporary fluctuations.

It should be explained to the individual to whom special tests are recommended in the interests of his health that such supplementary investigations may show negative results, but that since many cases presenting similar symptoms show positive results, such tests have an important protective value and should be looked upon as the best kind of life insurance. Also, it is often found that supplementary tests which prove negative are reassuring to those with psychoneurotic tendencies, and to those who suffer from so-called "imaginary ills." For example, syphilophobia often disappears after repeated negative Wassermanns are obtained.

Written Reports.—As suggested, the mechanism of the counsel given examinees will vary somewhat, depending upon

the agency rendering this service. There are two things to keep in mind in this connection: (1) The reports rendered by the physician making the examination, who, it is assumed, will have medical supervision of the subject following the examination; and (2) those rendered by organized medical centers where the work is wholly preclinical, where no treatment is given, and where the individuals examined are directed to seek any necessary medical attention from their family physicians.

A complete written report covering the periodic health examination will consist of the following :

(*a*) Letter of counsel.
(*b*) Letter to family physician.
(*c*) Detailed report of physical findings.
(*d*) Reports on supplementary investigations.
(*e*) Diet and exercise instructions.
(*f*) Educational leaflets on hygienic problems.

Detailed written reports should cover the same field as the verbal reports. Written reports have an advantage over verbal reports in that it is not customary to render them until the results of all the supplementary investigations are at hand. This enables the physician to study the case as a whole, taking into consideration the results of special tests as well as the points brought out in the general physical examination and the personal and family histories covering the matter of previous illnesses as well as habits of hygiene.

The written report has the further advantage of furnishing the individual with a detailed list of the impairments revealed by the examination and advice regarding their correction. Often the subject overlooks advice or forgets points stressed in the course of verbal counsel, which danger is eliminated when he is furnished with a written report that will serve as a "ready reference" or reminder.

In preclinical centers where the findings of the examiner are interpreted and reported on by a medical reviewing staff, the reviewer should be able to take his cue from the examiner, at the same time giving due weight to the testimony of special examinations, which were not in the possession of the examiner at the time of the physical examination. In interpreting data

[1] See Figs. 70–72 in the Appendix, p. 339-342.

derived from various sources, such as the history, general examination, special *x*-ray or laboratory tests, care must be taken not to attach undue importance to the results of any particular single test. The case must be considered *as a whole.*

Experience in the handling of many thousands of cases justifies the assertion that if the history and physical findings are accurately recorded in detail as outlined in the section on Taking the History and Recording the Findings,[1] the reviewing staff encounters no difficulty in getting the proper slant on the type of individual and the health problems involved. The reviewer will take a long look ahead and carefully balance his counsel with regard to the regulation of hygiene, considering every phase of the individual's needs in the matter of any further special tests or type of treatment to be sought.

In a center where no treatment is given the reviewer may find it necessary to advise the subject, for example, that the findings suggest the importance of submitting the evidence to a competent neurologist, or surgeon, or general practitioner, or dentist, as the case may be, so that proper treatment may be instituted. He should not include in his report any recommendation that will be a limitation upon the practitioner to whom the patient goes for treatment; nor should he include anything in his report that could justifiably be construed by the medical consultant as an interference between himself and his patient, or as lifting from the practitioner any responsibility as to a final decision regarding the government of the case.

Those working strictly in the preclinical field will be careful to keep well within that field and leave the medical consultant a free hand to exercise all his powers and resources in doing the corrective work.

The letter of counsel should be accompanied by detailed correct and scientific reports of the examination, so that these may be available to the family physician or medical consultant.

It is important for the individual practitioner who does this work, or for reviewers in medical centers, to consider any possible future course that would have protective value, and explain this fully to the individual examined. There are *degrees* of need in such matters, and it cannot be said in an

[1] See p. 24.

absolutely dogmatic way that a test is either necessary or unnecessary. A test may have value and yet in a strict sense not be absolutely necessary. It should be kept in mind that in a thorough-going, constructive program for the protection of health and the upbuilding of vitality it is sometimes wise as a matter of precaution to include a particular line of investigation, though there may be no *menacing* conditions that make it imperative at the moment.

The study of physical conditions in the human body does not differ in principle from the study of any other conditions in the universe. The largest number of facts must be assembled if the highest degree of accuracy is to be attained in the interpretation of the conditions. Whether these facts are supplied through the hypersensitive ear of the diagnostician or the testimony of the electrocardiograph is of little importance to the individual or to the public, but those whom the medical profession serve are entitled to demand that every reasonable scientific check be applied to safeguard the accuracy of the findings. Medical diagnosis will not suffer in the least in utilizing engineering measures of precision where these are attainable. The danger lies in attempting to apply standards which have not yet the weight of scientific demonstration behind them. There is no reason why these instruments of precision and laboratory methods should impair the thinking power of the qualified physician or lead him into superficial habits of mind in the consideration of his patients.

With the advance of laboratory work and the closer study of underlying conditions according to the methods of science the call on the mentality of the physician will be greater rather than less, but his mentality will be engaged in a higher type of work than attempting, for example, to outline the contour of the heart by auscultation and percussion. If this physical problem can be settled for him by the *x*-ray and the electrocardiograph, he is free to devote his attention to the vast number of clinical problems that are now obscure even to the most highly gifted minds. If the rough work can be done by instruments, it is fitting that the finer work of analysis and interpretation receive the attention of what Metchnikoff used to call "the nobler brain cells."[1]

[1] See Appendix, p. 365.

In the various sections of this book we have outlined the type of special tests and analytical measures that are desirable under certain conditions, and this will serve as a practical guide to those who wish to render a very complete service in connection with periodic health examinations. At all times caution should be exercised to avoid conveying undue alarm. It is well to keep to general terms when calling attention to any organic impairment. Instead of naming a "disease" and having the examinee so label himself and unduly worry about his condition, the main requirement is to get the individual under medical supervision.

As already suggested, leaflets covering various diet and exercise instructions, as well as other problems of hygiene, should be furnished examinees by the physician or medical center rendering the periodic health examination service.

There is included in this section excerpts taken from some of the leaflets listed below, which have served this purpose and have been found by experience to convey to the layman in simple, non-technical language helpful suggestions to supplement the advice given in the verbal or written report and letter of counsel.

The Sixteen Rules of Hygiene

The general rules of personal hygiene have been summarized as follows:

I. Air:

1. Ventilate every room you occupy.
2. Wear light, loose, and porous clothes.
3. Seek out-of-door occupations and recreations.
4. Sleep out-of-doors if you can.

II. Food:

5. Avoid overeating and overweight.
6. Avoid excess of high protein foods, such as meat, flesh foods, and eggs; also excess of salt and highly seasoned foods.
7. Eat some hard, some bulky, some raw foods daily.
8. Eat slowly and *taste* your food.
9. Use sufficient water internally and externally.

III. Poisons:

10. Secure thorough intestinal elimination daily.
11. Stand, sit, and walk erect.
12. Do not allow poisons and infections to enter the body.
13. Keep the teeth, gums, and tongue clean.

IV. Activity:

14. Work, play, rest, and sleep in moderation.
15. Breathe deeply; take deep-breathing exercises several times a day.
16. Keep serene and whole-hearted.

The possible scope of the counsel to be given by the general practitioner or by medical centers in the conduct of periodic health examinations is suggested by the following list of leaflets:

How to Keep Well.
Food.
Overweight.
Underweight.
Fruit an Aid to Health.
Table of Energy Value of Foods.
Water and Health.
Overstimulation (Coffee and Tea).
Alcohol.
Tobacco.
Setting-up Exercises.
Posture.
Eyes.
Mouth and Teeth.
Care of the Skin and Scalp.
Child Hygiene.
Shell Shock and Life Shock.
Learning to Play.
Work, Worry, Fatigue.
Hygiene of Sleep.
Constipation.
Bowel Regulation.
Hygiene at Middle Life.
Significance of Urinary Findings.
Organic Diseases.
Prevention of Colds.

Protecting the Lungs.
Headaches.
Nerves and Grouches.
Menstrual Period.
Pregnancy.
Sugar in the Urine.
Tumors.
Rectal Troubles.
Hernia.
Focal Infection a Cause of Many Diseases.
Venereal Disease.

Food

The following outline covering the fundamental principles of correct eating may be accepted as fairly representing the consensus of scientific judgment in this matter:

The human body is very much like an engine. It needs fuel to keep it running. As it has to be built, so must it be repaired from time to time; also it must be regulated. Hence we need:

A, Fuel foods; B, building or repair foods; C, regulating foods.

Classification of Foods

As in the case of an engine, the main requirement is for fuel. Unlike an engine, however, if the human body does not secure sufficient fuel, it will literally burn itself to death, the tissues being drawn upon to supply the fuel. On the other hand, the human engine may easily become overstoked by an excess of fuel. (The unit of fuel is the unit of heat or energy, called the large "calory," and represents the amount of heat required to raise 1 kilogram of water 1 degree Centigrade, or 1 pound of water 4 degrees Fahrenheit.) The following list shows the main fuel foods, that is, foods which are primarily useful for fuel rather than for repairing or building tissue. They supply energy for muscular work. Mental work requires so little extra fuel that it is not necessary to consider it specially. There are three groups of fuel foods. The foods in each group are given here in the order of their cost per calory (during normal market conditions), the cheapest food—those giving

the most energy for the money—being the first on each list:

Starchy Foods

Cornmeal,	Hominy,
Broken rice,	Oatmeal,
Flour,	Rice,
Macaroni,	Spaghetti,
Cornstarch,	Dried lima beans,
Split peas, yellow,	Dried navy beans,
Bread,	Potatoes.
Bananas,	

Fats

Oleomargarin,	Nutmargarin,
Drippings,	Lard,
Salt pork,	Peanut butter,
Milk,	Bacon,
Butter,	Cream.

Sugars

Sugar,	Corn syrup,
Dates,	Candy,
Molasses,	Most fruits.

About 80 to 85 per cent. of the fuel for the body should come from these groups. Starchy foods should be used in the largest amount, fats next, and sugars least. (Meats and flesh foods also furnish fuel, but are expensive for the purpose; if relied on chiefly for energy they would furnish a great excess of protein.)

The second class of foods are those rich in building and repair material. They are divided into proteins and minerals.

1. *Proteins, or "Body Bricks."*—These food elements are found in greatest abundance in lean meat of all sorts (including fish, shell food, and fowl), milk, cheese, eggs, peas and beans, lentils, and nuts. There is also a fair amount of protein in cereals and bread (about 10 per cent.), which are both building and fuel foods. Most foods contain some protein. Those just mentioned are richest in protein, and hence are termed "building" or "repair" foods.

The following is a list of the building and repair foods in the order of their cost (under normal market conditions). Those which are cheapest—*i. e.*, which give the most building and repair material for the money—are at the beginning of the list:

Beans, dried white,[1]
Dried peas,[1]
Oatmeal,[1]
Cornmeal,[1]
Beans, dried lima,[1]
Bread,[1]
Bread, whole wheat,[1]
Bread, graham,[1]
Soy bean,
Salt cod,
Milk, skimmed,
Cheese, American,
Peanuts,
Macaroni,
Butter fish,
Cod, steak,
Haddock,
Mutton, leg,
Beef, lean rump,
Milk,
Beef, lean round,
Lamb, leg,
Eggs, second grade
Halibut,
Porterhouse steak,
Eggs, first grade,
Almonds, shelled.

2. *Minerals.*—These are found most abundantly in milk, green vegetables, fruit, cereals made from the whole grains, and egg yolks.

Regulating foods are foods which, quite apart from any fuel or repair function, are of use in promoting peristalsis, digestion, assimilation, or other vital processes.

1. *Minerals.*—Foods which contain minerals have been mentioned as repair foods. They are also regulating foods, and help to keep the body machinery running properly. For example, alkaline salts are required to maintain the reserve alkalinity of the blood; iron to maintain the hemoglobin or oxygen-carrying qualities of the blood; and iodin for its effect in maintaining the function of the thyroid gland.

2. *Water.*—This is an important regulating food. Many people drink too little. Six glasses of water a day is the average requirement—one between meals and one at meals.

[1] The proteins in these substances are not as complete as those in milk, meat, eggs, and the other sources mentioned. This lack is safeguarded, however, in a diet containing in addition to these substances liberal quantities of milk and milk products.

3. *Ballast or Bulk.*—This is necessary to enable the bowels to move freely. It is furnished by cereals and vegetable fiber, which is found in whole wheat or graham flour, in bran, leaves and skins of plants, and skins and pulp of fruits. Examples are:

Vegetables

Peas,	Carrots,
Beans,	Turnips,
Lettuce,	Turnip tops,
Water-cress,	Celery,
Oyster plant,	Salsify,
Cabbage,	Spanish onions,
Brussels sprouts,	Spinach,
Tomatoes,	Beet tops,
Endive,	Kale,
Parsnips,	Dandelions.

Fruit

Apples, baked or raw,	Cranberries,
Pears,	Prunes,
Currants,	Dates,
Raspberries,	Figs.

4. *Hard Foods.*—Vigorous use of teeth and jaws is insured by hard foods, such as crusts, hard crackers, toast, zwieback, fibrous vegetables and fruits, celery and nuts, which are necessary to keep the teeth and gums in a healthy condition.

5. *Protective Foods or Vitamins.*—In addition to minerals, proteins, carbohydrates, and fats, the body requires certain specific food substances termed "vitamins." These are rather widely distributed in food products, but are more concentrated in some than in others. The absence of these vitamins, or their inadequacy in the diet, leads to certain serious diseases—beriberi, scurvy, rickets (partially), and also to lowered conditions of health not now classified.

Vitamin deficiency can be guarded against by giving anti-scorbutic food in infancy, such as the juice of oranges or canned tomatoes, after the first month, and later in life by including in the diet milk and milk products, an abundance of green vegetables and fruit, and a certain amount of whole cereal.

Among fruits, oranges, lemons, and grape-fruit are richest in vitamins; spinach, lettuce, tomatoes, and raw cabbage are richest among vegetables. These foods (fruits and vegetables) are also valuable in maintaining the reserve alkalinity of the blood and in maintaining intestinal activity. Remember that milk and leafy vegetables and fruit are required to balance meat, potatoes, bread, and cereals, so far as vitamins are concerned.

While we know that a man of average weight and moderate activity requires from 2500 to 3000 calories, or heat units, of food daily, it is not necessary to measure the calories, but to watch the scales. If the weight is at the ideal point,[1] one need not worry about calories. It is not at all likely that one need worry about protein, as protein is present in sufficient quantity in all but very narrow diets. A safe diet is well diversified and proportioned and includes a liberal admixture of the regulating foods. When the weight is in equilibrium the needs of the average individual are covered if an excess of protein food is avoided by eating meat or other high protein food not more than once daily, and if regulating elements are supplied by milk, green vegetables, and some raw food each day.

While it is not necessary to weigh one's food or measure the calories or heat units that it furnishes, it is well to know the varying requirements of different types of individuals as shown in the following table:

Average Daily Food Requirement in Calories

Grandparent (seventy to eighty)	2000–2500
Father[2]	3000
Mother	2500
Boy or girl of thirteen	3000
Boy or girl of nine to eleven	2500
Boy or girl of seven	2100
Boy or girl of three to four	1100–1400

Food should be thoroughly chewed or insalivated. This end can easily be attained not by directing attention to chewing,

[1] See Weight Tables, pp. 343–345.

[2] Average man doing an average day's work. Hard manual labor will increase requirement of father to 4000 or more calories. If he be over 6 feet tall, 300 calories are needed in addition.

but by tasting the food thoroughly until it slides naturally down into the stomach. If attention is given to tasting the food during the first few chews the habit will easily be formed.

Special Adjustments of the Diet

The diet of the average person is usually so badly adjusted that the physician will find it necessary or desirable in practically every case to recommend certain changes. Some of these changes are indicated for the better regulation of a practically normal organism and in the interest of general nutrition, while others are required because of frank pathological conditions or disturbed metabolism.

The regulation of diet in certain pathological conditions in which diet is the main therapeutic agent, such as gastric ulcer, duodenal ulcer, nephritis, diabetes, gout, and where abnormal gastric symptoms are present in pregnancy, should be left to the specialist in the particular field and adjusted from time to time to meet individual requirements.

Diet requirements commonly encountered in the course of the periodic health examination are suggested in the following list:

Normal average person.
Overweight.
Overweight and constipation.
Underweight.
Underweight and constipation.
Elderly.
Constipation.
Intestinal putrefaction.
Gastric hyperacidity.
Visceroptosis.
Nervous dyspepsia.
Early signs of organic change (heart, blood-vessels, kidneys).

What might be called a typical *Normal Average Diet* follows. This is a well-balanced, relatively low-protein menu, furnishing 2400 to 2800 calories and about 70 to 75 grams of protein a day, depending upon the size of the portions:

Breakfast: Choice of orange, apple, ½ grape-fruit; other fruits in season.
Choice of: Any whole cereal—rolled oats, wheatena, oatmeal, etc., with milk or cream.
Choice of: Graham or whole wheat toast or muffins; butter.
Choice of: Cereal coffee, caffeinless coffee, or coffee[1] of very moderate strength (one-half hot milk); milk or cocoa.
Eggs may be taken if very light portion of meat or fish or fowl is taken at dinner, and breakfast portions of other foods are moderate.

Luncheon: Vegetable soup (no beef bouillon or consommé); rolls or graham bread and butter.
Choice of: Vegetable, fruit, or nut salad.
Choice of: Stewed fruit, apple pie, or fruit tart.
Choice of: Milk, cocoa or buttermilk, sour milk, or weak tea.

Dinner: Choice of any soup (no beef bouillon or consommé); crackers.
Moderate helping of any flesh food—fish, meat, or fowl.
Choice of: Baked, boiled, or creamed potatoes; or boiled beets, creamed carrots or turnips, parsnips, or egg plant.
Choice of: Green peas, lima beans, string beans.
Choice of: Lettuce, romaine or cabbage salad; cauliflower or boiled cabbage.
Choice of: Custard, fruit pudding, apple tapioca pudding, grape-fruit, sliced oranges, or other fruit.
Choice of: American or cream cheese.

Diet in Overweight.—Those who wish to bring their weight to the normal and keep it there must do more than blindly follow special menus or routine diet and exercise measures.[2]

The principles underlying weight reduction and the maintenance of normal bodily weight are very simple.

Overweight is due to the fact that more food of a *certain kind* has been taken than is required by the body to maintain its activity. This excess of food is accumulated as *fatty* tissue.

In people who are extremely inactive the quantity of fat-forming food taken may not exceed what would be entirely appropriate for a person of normal activity. It is necessary, therefore, to find out to what extent the accumulation of fat is due to physical inactivity, on the one hand, or excessive food intake on the other.

[1] Tea and coffee are included in these menus as concessions to custom and not as components of an ideal diet. Weak tea or coffee if well made add flavor to the diet and can do little harm.

[2] See Adjustment of Exercise for Overweights, pp. 272–273.

The average civilized individual is necessarily physically inactive. The average person cannot adjust his or her activities to conform to the ideal of physical exercise.

This means that in keeping the weight at the proper point more reliance must be placed upon diet than upon exercise. The average exercise system for reducing weight is illogical, oftentimes dangerous, and usually futile and temporary in its effects. When we know that it requires eight hours' steady walking on the level to burn up about 4 ounces of fat we can readily see how difficult it is to keep the weight down by exercise alone.

Fortunately, it is possible by simple regulation of the diet to keep these 4 ounces of fat off the body or get them off the body, and secure the equivalent in weight regulation of eight hours' walking on the level or five hours of hill climbing.

It is not the intention to disparage exercise, which should be followed for its other beneficial effects as well as for the weight reduction; but in heavyweights this must be graded very carefully according to the type and the physical condition. By all means the individual should secure as much exercise as possible within the limitations laid down by his advisers, but it is a mistake to suppose that the weight cannot be reduced and kept where it belongs without strenuous exercise far beyond the individual's power to maintain regularly.

In dealing with this condition the diet statement should be analyzed and an effort made to find out the fundamental dietetic errors that result in overweight. These errors should be pointed out and the subject urged to make an earnest effort to correct them.

The principle to be followed should involve a cutting down but not an absolute cutting out of the high caloried or fat-forming foods. It is a good plan when ordering a meal which is intended to differ in any way from the menu furnished to keep away from the high fuel foods as far as possible. On the other hand, it is permissible to range quite freely among the low fuel foods, provided they are not cooked in such a way with fats, sugars, or starches as to add to their fuel value.[1]

The average individual at rest requires between 1600 and 1700 food calories daily. Moderate activity would add from

[1] How to Live, by Irving Fisher and Eugene Lyman Fisk, p. 296.

500 to 1000 calories to this requirement. If the fuel in the diet furnishes less than the average heat production of the body, the fatty tissue will surely be consumed and the weight come down. It is on this principle that the diet should be adjusted.

It is neither feasible nor necessary to ascertain the heat production in each case. This can be roughly estimated according to the occupation and type of individual. The supreme test is the result shown by the scales. The principal fat-forming foods *must* be reduced to the point where weight reduction will take place. The amount of these foods that a subject can take and yet maintain proper weight *can only be determined by individual trial.*

For this reason the examinee should be advised to report periodically, so that there may be a review of the conditions and counsel given as to further procedure.

Overweight subjects should be warned against certain needless and often harmful measures often employed in combating overweight, such as:

(*a*) Overstrenuous exercise.

(*b*) Drug treatment of any kind—except as prescribed by a physician.

(*c*) Sweating treatments, Turkish baths, etc. Such treatments do not remove any fatty tissue; they simply withdraw water from the body which is promptly taken up again in the intervals between baths.

(*d*) So-called thirst treatment, or abstinence from water. There is no reason why the heavyweight should not take the average amount of water—six glasses a day. Indeed, this is required for purposes of elimination. Excess of water at meals should be avoided, and very heavy people perhaps do better to take water principally between meals, as water at meals stimulates appetite.

(*e*) There are no special breads, drugs, mineral waters, or other similar forms of treatment that have any merit. Some of these preparations are distinctly harmful. Barring cases of active endocrine disease, nothing in weight reduction can be accomplished that depends upon any principle other than reduction of the high fat-forming foods and the substitution of those that have low fat-forming qualities.

In cases of overweight due to profound disturbance of the endocrine glands medical supervision is important; and all cases of overweight that do not rapidly yield to faithful diet and exercise regulation should receive metabolism tests, *x*-ray of the sella turcica, blood-tests for sugar, and, in fact, thorough medical supervision.

As the weight comes down there may be a feeling for a time of "goneness" or depression. This is often purely a mechanical matter due to a more rapid emptying of the stomach under a low caloried diet.

Such a condition can often be met by a harmless between-meal indulgence such as a cup of tomato bouillon or vegetable purée. Such food has almost no fat-forming qualities, but may prove grateful and relieve hunger. Another cause for such a feeling is the disappearance of the bulky fat in the abdominal region. Middle-aged people who have carried a great excess of fat often derive comfort from the wearing of an abdominal belt or support which can be adjusted as the weight decreases. In the average case this feeling passes as one becomes adjusted to the diet, and the ultimate result is a sense of increased vitality.

A simple cutting down of the fat-forming foods is not sufficient. There must be substitution of the bulky green vegetables in order that there may be a physical and mental sense of satisfaction in a "square" meal. Bulky foods allay the hunger contractions of the stomach. As many of these foods are rich in vitamins and the bulk is necessary to maintain intestinal activity, they are helpful in overcoming any tendency to constipation and are essential features of a healthful diet, entirely apart from weight reduction. Only in exceptional instances are they ill adapted.

Depression or feeling of weakness is also caused by neglect of a reasonable amount of exercise as the weight decreases. Physically lazy people who rely solely on diet for reduction may suffer in this way through flabbiness of the muscular system. Undue reduction of meat or flesh foods is another source of depression. Under a low caloried diet such as is necessary for weight reduction there is a loss of nitrogenous matter from the muscular tissue which must be replaced by adequate protein from eggs, milk, meat, or flesh food. Lean meat is not high in calories and can be taken in moderation.

The value of attaining weight reduction through this rational physiological method of simple regulation of diet lies in the fact that such reduction is usually permanent. When the individual becomes adjusted to the dietary and to modifying it in accordance with his activities it is a very simple matter to keep the weight within bounds. If a tendency to gain is noticed, a modification of the diet can easily be made to correct this.

Finally, it should be borne in mind that success will depend upon properly limiting foods of the following type:

(*a*) Fats, such as butter, fatty portions of meat, salad oil, cream, and nuts, which contain a large proportion of fat.

(*b*) The starchy foods, especially bread, bread-stuffs, and pastry. These are probably the principal factors in weight production. Since most bread-stuffs are taken with butter, and since pastry has added to its starchy value both fat and sugar, it is readily seen that these are concentrated fat-forming foods.

(*c*) Sugars and sweets of all kinds. Sugar is pure fuel. Apart from this and its flavoring qualities, it has no value in the diet. Saccharin[1] may be used instead of sugar for sweetening. Cutting out sugar at the table will in the course of a few weeks represent a substantial equivalent of body fat and permit a more liberal use of foods that assist in balancing the diet, such as milk, bread, cereals, and vegetables.

Lean meat, other flesh food, and non-fatty fish are not highly fat forming. Potatoes, so often excluded from reducing dietaries, are quite permissible. While containing some starch, they are, in fact, mostly water and belong to the bulky foods. If potatoes are not taken with butter or cooked with fat they may be taken regularly as the best source of starch.

The mainstay of the diet to satisfy hunger and avoid a sense of deprivation will be found in the following foods, which can be eaten in moderation if not dressed or cooked with fats or sugar, and can be adjusted on a basis that will present the following not unattractive dietetic picture of permitted foods:

[1] Not to exceed 4 grains daily, ½ grain and often less will sweeten a cup of tea or coffee.

Eggs, meat, fish, fowl, soups, green vegetables of all kinds, most fruits, potatoes, milk, buttermilk, tea, and coffee. Cereals, bread, and cake may usually be included in restricted amounts.

By cutting out sugar as a sweetening agent at the table, by omitting bread and bread-stuffs from two meals during the day, and by eliminating heavy pastries, candy and extra food indulgences, such as sodas, sundaes, etc., an enormous advantage may be gained in weight reduction.

The use of alcohol in any form imposes an obligation to cut down the fat-forming foods since alcohol is a fat sparer.

These are the general principles underlying rational weight regulation. Their application to the individual requires a consideration of the diet customs, physical condition, and the personal and family history, as is customary in the periodic health examination.

In weight reduction care must be taken to avoid acidosis. Fat can burn in the body only when carbohydrates burn with it. If fat does not burn completely, it leaves acid products. Hence the danger of extremely low calory diets and of overrigid weight reduction. A program for gradual and moderate reduction is safer.

Following is a sample of a simple *dietary for the overweight* who has no serious organic disease. This food allowance may in some cases prove too liberal. As suggested, in all adjustments of diet the scales must tell the story. If the diet does not bring about gradual reduction of weight to the normal point, the food portions should be reduced.

Breakfast: Choice of fruit, orange, apple (raw), ½ grape-fruit, pear, berries, melon, plums. No sugar or cream on fruits.

Choice of: Eggs (1 or 2 boiled, coddled, poached, or plain omelette); bacon (4 small slices, lean); cod-fish ball (1 small, 2 inches in diameter); cereal (oatmeal, wheatena, cornmeal, rolled oats—¾ to 1 cup; shredded wheat—1 biscuit; puffed rice or puffed wheat—1½ cups). Milk, but no cream or sugar on cereal.

Choice of: 1 bran biscuit, 1 wheat roll, 1 slice whole wheat bread, 1 slice toast, 1 muffin (graham, whole wheat, etc.), 1 popover.

Butter: 1 scant tablespoonful (medium-sized butter ball) *no more.*

Choice of: Coffee, cereal coffee, caffeinless coffee, buttermilk (1 glass). Use hot milk in coffee, or only a dash of cream. No sugar. Use ½ grain saccharin for sweetening.

Luncheon: Choice of any vegetable soup (not creamed), tomato bouillon, chicken soup (not creamed).

Choice of: Lettuce and tomato salad; lettuce and cottage cheese (5½ tablespoonfuls cheese) salad; fruit salad; cream cheese (2 inches by 1 inch) and lettuce; chicken salad (one small serving), macaroni with tomato sauce (5 tablespoonfuls); Swiss cheese.

Choice of: 6 saltine crackers, 1 roll or muffin, 1 slice toast.

Choice of: Buttermilk (1 glass), tea (sweetened with ½ grain saccharin).

Dinner: Choice of oyster stew (½ cup), tomato bouillon, vegetable soup (not creamed); Little neck clams or oysters on half-shell.

Choice of: 1 moderate helping of non-fat meat: lamb, roast beef, small lamb chop, steak with mushrooms or plain; fish: bluefish, halibut (broiled); macaroni and cheese (½ cup); egg omelette (1 egg).

Choice of: Potatoes (1 baked, or boiled, mashed ½ cup).

Choice of: Brussels sprouts, cabbage (raw or cooked), squash, spinach, beets, carrots, string beans, corn (canned), tomatoes, lettuce salad, lettuce and tomato salad. Demi tasse; 2 saltine crackers.

Choice of: ½ cantaloupe or slice of watermelon, stewed fruit, small piece of plain cake, or one or two cookies.

When the weight is reduced to the ideal point the subject may liberalize his diet along the lines of the following suggested menu:

Breakfast: Choice of apple, orange, banana, grape-fruit, berries, melon, plums. No sugar or cream on fruits.

Choice of: 1 shredded wheat biscuit, cream of wheat (⅜ cup), corn flakes (1 cup), steamed rice (¾ cup). Milk with cereals (½ glass).

Choice of: Graham bread (2 slices), 1 French roll, 2 baking powder biscuits, 2 pieces toast, 1 popover, 1 bran biscuit.

Choice of: 1 egg (scrambled, poached, omelette, or boiled), 3 small pieces bacon, 1 fishball (small).

Choice of: Coffee, cereal coffee, caffeinless coffee, buttermilk (1 glass). Use hot milk in coffee, or only a dash of cream. No sugar. Use ½ grain saccharin for sweetening.

Luncheon: Choice of clear soup, vegetable or tomato soup, chicken soup; 1 glass buttermilk.

Choice of: Macaroni with cheese (¾ cup), 1 meat ball (medium), 1 deviled egg, 1 stuffed pepper, cold slaw (1 cup), rice with tomato (½ cup), lettuce salad with French dressing (2½ tablespoonfuls), lettuce and cottage cheese with French dressing (1 tablespoonful); 6 saltine crackers.

Choice of: Apple tapioca (¼ cup), apple snow (1 cup), cup custard (⅓ cup), lemon jelly (½ cup), boiled custard or creamy rice pudding (¼ cup, plain cookies (2½ inches in diameter (or 2 macaroons).

Dinner: Choice of clear bouillon (1 cup), tomato or chicken soup (¾ cup), or little neck clams (12), or oysters (12 medium).

Choice of meat (moderate helping): Lamb, roast beef, small chop, steak with mushrooms, halibut steak, bluefish (broiled), macaroni and cheese (½ cup); 1 dinner roll.

Choice of potatoes: Boiled or baked (medium sized), mashed (½ cup).

Choice of two vegetables: Brussels sprouts, cabbage (raw or cooked), beets, canned corn, spinach, string beans, succotash, tomatoes, lettuce salad (French dressing—1 tablespoonful).

Choice of: Creamy rice pudding (¼ cup), Spanish cream (1 cup), tapioca cream (⅔ cup), apple snow (1 cup), apple tapioca (¼ cup), lemon jelly (½ cup), or custard (½ cup). Demi tasse.

Diet in Underweight.—Pronounced underweight before the age of twenty-five is an unfavorable condition, as it is often associated with lack of resistance to pulmonary affections and to other diseases of youth. After the age of thirty underweight, unless extreme and unless associated with lowered health, is not in itself an unfavorable condition. Indeed, an investigation of the combined mortality experience of 43 life insurance companies shows that the lowest mortality at middle life is found among those a few pounds underweight.[1]

When underweight is associated with a tendency to frequent colds and there is a condition of debility, anemia, or general malnutrition, it is, at any age, an unfavorable symptom, especially if there has been recent loss in weight. Under such conditions, dieting should be directed to improving nutrition and inducing a gain in weight. Thin people lose heat more readily than stout people, as they expose more skin surface in proportion to the body weight, and they have more active working cells in proportion to the body weight. They require, therefore, an abundant supply of energy food or fuel food—fats and carbohydrates.

Although the weight that is lacking can be supplied only by food, diet alone cannot accomplish this result. Every effort should be made to stimulate the whole organism by healthful recreation. The exercise in the beginning should be kept well within the individual's capacity and broadened as the weight increases. Relief from nervous strain and overwork, as well as outdoor sleeping and plenty of fresh air, are of great importance.

[1] See Appendix, p. 343.

As to diet, the problem is to secure the largest number of calories in the most digestible form. The following menu will furnish about 3450 calories, while the requirements of the average individual of very moderate activity is only 2500 to 3000 calories. Hence, if such a dietary is faithfully followed and the food well digested and assimilated, an increase in weight is almost certain to result:

Breakfast: Fruit juice, farina with dates or rolled oats or wheatena with cream; scrambled egg; buttered toast or rolls; milk mixture,[1] or cocoa, or caffeinless coffee, or cereal coffee with hot milk and cream.

Luncheon: Lettuce and tomato or fruit salad; rolls with butter; vanilla ice-cream; chocolate, or milk mixture, or malted milk and chocolate.

Dinner: Creamed soup; moderate meat, fish, or fowl portion, or omelette; buttered baked potato (skin eaten); buttered lima beans; whole wheat or graham bread, butter; baked apple with cream and sugar, Indian pudding, apple or fruit pudding; milk mixture or chocolate.

While it is, of course, extremely important to get as many calories as possible in a weight-producing diet, it is also necessary to include plenty of green vegetables, fruits, and raw foods in order that the regulating elements may be supplied in addition to the fuel. These foods are important, both for their mineral content to combat any tendency to anemia, and for their bulk in order to stimulate proper action of the bowels. They also increase appetite and promote digestion and assimilation of the essential fat-forming foods.

Diet in Elderly Life.—In late life, as activities become limited, the food requirement is much lowered, while the food consumption of former years is too frequently maintained. The cells of the body are less active and call for less fuel even though the individual may be apparently quite active. Certain modifications of the diet in later life are, therefore, very necessary. Moderation and simplicity are the watchwords.

In some respects the diet should resemble that of early life—fruit juice, well-cooked cereals, milk, eggs in moderation, strained vegetables, and cereal puddings are the main features

[1] A milk mixture which is a fattening diet in itself is made by adding ½ to 1 cupful of cream, and 2 to 4 tablespoonfuls of milk-sugar (dissolved in half a glass of boiling water) to a quart of milk. If, in addition to generous amounts of other fattening food, this beverage is used at meal times or between, a gratifying increase in weight will result.

of the diet. Meals may need to be frequent though small in quantity. Fats should be used rather sparingly. Cream, butter, bacon, olive oil are the best form of fats, which can be used in moderation with bread, cereals, etc. Warm foods, dilute tea or coffee, or soup at commencement of meals are preferable to cold water as a stimulus to gastric activity.

Vegetables should be thoroughly cooked and mashed or put through a sieve, as purée or soup.

Following is a type of daily menu for elderly subjects[1]:

Breakfast: Soft-cooked egg or omelet or well-cooked cereal with cream zwieback or toast; weak tea or coffee with hot milk or cream.

Luncheon: Cream soup or vegetable purée with croutons. Broiled, baked, or boiled fish (small serving); or cheese souffle, or egg timbale; baked, riced, or mashed potato; stewed or baked fruit; weak tea or coffee with hot milk or cream.

Dinner: Broth; minced chicken, lamb, mutton, or beef (small serving); zwieback or toast lightly buttered; a cooked vegetable, mashed or sifted (as peas, squash, asparagus tips); cereal pudding or custard.

Correction of Constipation

Constipation is a very common affection, largely the result of modern habits of living and eating. Unless there is a thorough emptying of the intestinal canal every day, constipation exists. *Under proper diet* the bowels should move more than once a day. Lack of vigorous outdoor exercise, insufficient intake of water, the eating of soft-cooked foods, a concentrated meat diet, lack of cellulose or waste material in the diet, and neglect of the bowel function are the chief causes of intestinal stasis. Generally this is a preventable condition, and there are few cases that cannot be greatly benefited by proper diet and exercise. The bowels should be given an opportunity to move after each meal, or at least at regular intervals to establish a regular bowel habit. Only one movement a day usually reflects inefficient bowel action.

The right amount of water taken at the proper time is one of the greatest preventives of constipation. Excess of water

[1] When it is customary for the individual to arise some time before the usual breakfast hour, hot milk or hot malted milk or weak tea or coffee with hot milk or cream may be taken before breakfast. Likewise, in midafternoon a similar beverage may be given, and broth and toast before retiring at night.

should not be drunk by the very feeble or by those suffering from heart trouble or dropsy, but water taken rather freely when the stomach contains no food, especially before breakfast, is essential for good bowel functioning.

Other important measures that will relieve the average case of constipation are erect posture and deep breathing; vigorous, systematic exercise, bringing into play abdominal muscles; abdominal massage; the eating of bulky vegetable foods, that supply the necessary cellulose or waste material and promote the muscular activity of the bowel; regular attention to the bowel function.

The subject should be warned against a nervous fear of constipation. He should be made to realize that worry sometimes causes constipation.

It is well, even for the average person, to include plenty of bulky food in the diet to prevent the bowels from becoming sluggish. Where obstinate constipation exists, strict attention should be given to securing an abundance of food in the following classes:

1. Food rich in vegetable fibers, such as celery, cabbage, string beans, dried beans and lentils with their hulls, asparagus, lettuce, spinach, onions; raisins, figs, prunes, and other fruits eaten with their skins. Cereals from which the bran has not been removed, such as rolled or cut oats, and wheat should be included. Bran may be used in the form of bread, muffins, or biscuits.

2. Foods rich in vegetable acids, such as lemons, oranges, tomatoes, apples, cider, and other fruits, and fruit juices, except blackberries. Fruit juices should be taken early in the morning or late at night. Fruits may be eaten liberally at mealtimes.

3. Foods inducing slight gas formation, such as honey, molasses, spinach, onions, cauliflower. Gas tends to break up the mass in the intestines and has a stimulating effect. Carbonated waters are likewise serviceable in this regard. Vegetables are, of course, most acceptably taken as salads served with olive oil, which has a laxative effect. In cases where there is embarrassed heart action or weak heart gas formation is to be avoided, and the measures hereinafter described on bowel regulation are preferable to a large intake of bulky vegetables and gas-forming foods.

4. Water, especially if taken early in the morning on an empty stomach, is helpful, except where there is extreme lack of muscular tone. Pills, purgatives, mineral waters, and patent remedies should be strictly avoided, as they tend to enslave the bowel.

In combating constipation 1 or 2 glasses of cold water should be taken one hour before breakfast; also a hot and cold spray and ten minutes' exercise.

The following is a *suggested menu* for the correction of constipation which can be modified and varied by using the foods classified above as laxative:

Breakfast: An orange or ½ grape-fruit; cut oats, or other whole cereal and cream; whole wheat or graham muffins and honey; bacon. Any of the bulky vegetables may be taken, especially tomatoes, onions, and water-cress salad.

Luncheon: Lentil stew or unstrained vegetable soup (vegetable eaten); Boston brown bread, whole wheat or graham muffins; baked apple (skin eaten), or stewed fruit.

Dinner: Vegetable soup; moderate meat, fish, or fowl portion; spinach (large serving); baked potatoes (skins eaten); cabbage, lettuce, tomato or fruit salad; graham bread; steamed fig pudding with lemon sauce, or flavored with lemon.

Special Methods for Bowel Regulation.—If adjustment of the diet and exercise along the lines suggested does not very quickly bring about bowel regulation and thorough daily evacuation, certain special measures should be given a reasonable trial.

In long-standing or obstinate cases of bowel sluggishness *Plantago psyllium seed* may be tried. This seed has no drug effect, but combines the stimulating qualities of agar-agar or bulky vegetables and the lubricating qualities of mineral oil, since they become mucilaginous on absorbing moisture. They thus lubricate the bowel, besides adding to the bulk of the feces to a far greater degree than agar-agar.

In mild cases of bowel sluggishness 2 teaspoonfuls may be taken once or twice a day in hot water, while in more obstinate cases 2 tablespoonfuls or more may be taken daily.[1]

Agar-agar (Japanese seaweed) has no drug effect, but it increases the bulk of the intestinal contents and in mild cases

[1] Place the seed in a glass of hot water. Stir every few minutes until the water becomes lukewarm; then drink.

of constipation stimulates the bowels to action. It offsets any lack of bulk in the diet and accelerates the effect of such bulk or coarse fibrous material as there may be in the diet. A teaspoonful or more may be taken three times daily mixed with cereal, milk, or any portion of the food.

Mineral oil (purified liquid paraffin oil) may also be taken to supply lubrication, to soften the feces, and to accelerate the movement of the fecal mass through the bowel. It is best taken upon retiring, 1 to 2 ounces. It is not advisable to take it during the day, as leakage sometimes occurs. The claim has been made that the continual coating of the bowel lining with oil may interfere with nutrition. The oil is not fattening and has no drug effect.

Bran is very commonly used to overcome constipation by providing bulk and stimulation. It may be used in the form of bread, biscuits, or crackers, taken at one or more meals during the day, or it may be added to cereals. In some cases it works efficiently, but it is by no means a "cure all." Some authorities urge caution in its use, as it may prove irritating to the bowel lining. If the bowel muscle is very feeble, bran may mass in the intestines and fail to produce satisfactory evacuations. In cases of bowel spasm it is positively injurious. When used in large quantities to correct obstinate sluggish bowels it may have an irritating effect, and it is more desirable to try the other measures mentioned that provide stimulation without irritation. The possible irritating effect of the massing of the bran may be prevented or mitigated by the use of mineral oil.

The measures above suggested are for bowel regulation, not for emergency evacuation of the bowel. They may be continued indefinitely without impairing the bowel function, but as soon as regular action has been obtained careful diet should be relied upon if possible, and these special measures followed or resumed only when necessary.

The use of *isotonic salt solution* may be tried at intervals or short periods in the following way: From 2 to 4 glassfuls of a salt solution, made by adding 2 level teaspoonfuls of table salt to a quart of water (hot or cold), may be taken before breakfast. This in many cases will induce repeated thorough evacuation of the bowel within an hour with no such subsequent debilitating or irritating after-affects as follow the

use of mineral water, cathartics, pills, or castor oil. Although it is claimed by high authorities that no salt is absorbed under these conditions, and that practically all the solution passes quickly through the bowel in a mechanical way, this method should be used with great caution by people suffering from kidney trouble. For the average individual it seems safer and more desirable to bring about a steady regulation of the bowels by an adjustment of the diet and other methods suggested, rather than to depend upon this sudden mechanical evacuation. Such a measure may be employed in mild emergencies, although its advocates state that it should not be regarded as an efficient cathartic in cases where there is any serious clogging of the bowels and where an active cathartic may be necessary; also in some cases of chronic obstinate bowel sluggishness it does not prove effective. This method may be placed on a similar basis with that of an enema, and occasionally used to supplement the other measures described. It has been found helpful where the bowel action is irregular and ineffective and accompanied by excess of mucus.

Another measure of value is the use of *acidophilus cultures.* It has been found by Rettger, of Yale, and others that by implanting in the intestine heavy doses of acidophilus bacilli, the type that preponderates in the intestine in early life, the putrefactive bacteria are largely eliminated and the formation of poisonous substances in the bowels prevented. Acidophilus milk (not Bulgarian bacillus milk which is now known to have no specific action such as was formerly claimed for it) may be taken freely.

The use of *milk-sugar* alone in fairly large quantity (5 ounces daily during the first week and then reduced to $1\frac{1}{2}$ to 2 ounces) will favorably influence the bacterial flora of the intestine.

An *enema* affords rapid evacuation of at least the lower bowel if it is properly administered. It should be regarded as an emergency method and not regularly employed.

It is well for practitioners to keep in mind that what hygienists mean by the term "natural remedy" for sluggish bowels is a remedy consistent with those agencies which originally brought about evolution of the bowel tract as a muscular tube. These agencies did not include cascara sagrada, or calomel, or

aloin, strychnin and belladonna, but the fibrous vegetables and fruits. Neither was the human bowel evolved as a muscular mechanism by the injection, per rectum, of large quantities of fluid. The fluid was admitted at the other end of the tract.

If these measures do not bring about a thoroughly satisfactory regulation of the bowels within a reasonable time, then an *x*-ray study of the stomach and bowels should be made; also a special careful examination of the rectum with instruments to ascertain whether or not there is any organic condition causing spasm or obstruction. Probably no region of the body is more neglected than the rectum. The physician should bear in mind that many people dismiss itching piles, bleeding piles, and other rectal discomforts as comparatively trivial matters. Physicians do not always give the close attention and thorough investigation to this region that it deserves, when we consider the very serious results that often follow comparatively slight ulcerations, fissures, or piles.

Elderly persons who have suffered from constipation for many years are sometimes obliged to rely rather frequently upon laxatives for bowel action. The kind of drug used, as well as the dosage and frequency, should be known and approved by the physician. A combination of a small amount of medication with mineral oil or other aids may be more effective and less debilitating than larger doses of the drug laxatives. Even elderly persons, however, should not neglect the laws of hygiene in this regard, for laxatives are at best a source of unnatural stimulation, and their daily use should be considered only as a last resort.

There is a considerable difference of opinion among scientific authorities as to the effect on health of constipation. Some incline to the poison theory, so called "auto-intoxication," and believe there is absorption of poisonous substances from the bowels that seriously affects health, at least eventually. Others claim that there is little to fear in this respect; that constipation is a phase of our adjustment to civilization, and that such ill effects as there are constitute merely nervous reactions to the mechanical irritation. Our common sense tells us that an active healthy individual should have regular bowel movements. Any apparent immunity enjoyed by people with chronic constipation should not mislead us. All medical authorities are

agreed that, as a rule, constipation does produce unpleasant symptoms, and whether this be toxic or nervous, it is undoubtedly a condition that calls for correction.

The subject should be warned against worrying about constipation, or keeping his mind focused upon this defect of elimination. He should be urged to have confidence in methods which in most cases have been successful in combating constipation.

It is well to remember that the standard of bowel evacuation which accords with the established experience of the average civilized individual does not reflect a condition of perfect health and should not be set up as a standard of perfect health. These observations are made because of the criticisms occasionally emanating from clinicians as to the unsoundness of advocating more than one bowel movement daily. It has even been asserted that for some people one movement a week is adequate. Such a person, if rigidly examined from the standpoint of hygiene, would surely be found impaired, although from the standpoint of those who are satisfied merely with keeping people out of sickbeds or hospitals, no emergency condition of ill health would necessarily be found in these cases of extreme bowel sluggishness.

Diet to Combat Intestinal Putrefaction.—Where there is a tendency to intestinal putrefaction it is necessary to limit the amount of meat protein. Milk and milk products, such as cottage and other cheese, may be substituted for meat, and vegetable proteins may also be used, such as those in cereals, bread, peas, and beans. A liberal use of green vegetables and fruits also helps to sweep putrefactive products out of the intestine. Such foods ferment somewhat and hinder the action of the putrefactive bacteria. It has also been found that milk sugar and acidophilus milk are useful in combating this condition. Several ounces of sugar of milk taken daily, either in milk or in cereal, may be tried.[1] If simple dietetic measures do not suffice, an *x*-ray should be taken and careful examination of the bowels made in order to thoroughly analyze the trouble. Careful examination of the feces and of the stomach contents should also be made.

[1] When a person is overweight and on a weight-reducing diet the milk-sugar should replace other carbohydrate foods and should not be taken in addition to the regular diet.

The following is a suggestive menu for combating intestinal putrefaction:

7 A. M.: Glass of water or dilute fruit juice.

Breakfast: Thoroughly cooked cereal, with cream and milk-sugar; dry crisp toast and butter; fresh or stewed fruit; acidophilus milk.

Luncheon: Hot vegetable dish, as escalloped cauliflower; cabbage, tomatoes, or potatoes; macaroni, rice, or hominy, with cheese; macaroni or rice with tomatoes; or stuffed tomatoes; twice baked crusty rolls, or toast and butter; cereal pudding or fruit dessert; acidophilus milk.

Dinner: Vegetable or milk soup; egg, cheese or nut dish; cooked green vegetable; vegetable, fruit, or cheese salad; simple pudding, or frozen pudding, or frozen dessert, or crackers and cheese; milk with milk-sugar added, or acidophilus milk.

10 P. M.: Glass of hot water.

Diet Where Early Signs of Organic Change Exist (Heart, Blood-vessels, Kidneys).—In protecting the organs, especially the heart, kidneys, and blood-vessels, the first principle is moderation in diet. And yet one should be sure to secure adequate nutrition.

It should be borne in mind that certain types of food throw an extra burden on the organs,[1] especially the high protein foods, such as meat, fish, fowl, and eggs, and the high purin (uric-acid forming) foods, such as sweet breads, liver, other meats, fish, peas, and beans. These should be taken in great moderation—not more than once a day—as adequate protein will be secured from other elements in the diet, such as cereals, bread, vegetables, milk, and cheese. Highly salted and highly seasoned foods should be avoided and no salt used as seasoning at the table. Cottage cheese is an excellent substitute for meat. By watching the weight one can tell whether sufficient food is being taken. All articles of food that experience shows tend to disturb the digestion should, of course, be avoided. It is especially important to regulate the diet so that intestinal stagnation, or the putrefaction of food in the intestines, may be avoided. This can be attained by following a dietary along the following lines:

[1] We are aware that this raises debatable questions. Until these are settled a "safety-first" policy seems justified without going to extremes.

7 A. M.: Glass of water or dilute fruit juice.

Breakfast: Thoroughly cooked cereal with cream; dry, crisp toast and butter; fresh or stewed fruit.

Luncheon: Hot vegetable dish, as escalloped cauliflower, cabbage, tomatoes, or potatoes; macaroni, rice, or hominy, with cheese; macaroni or rice with tomatoes; or stuffed tomatoes or peppers; twice baked crusty rolls, or toast and butter; cereal pudding or fruit dessert.

Dinner: Vegetable or milk soup; egg; cheese or nut dish; cooked green vegetable; vegetable, fruit, or cheese salad; simple pudding, or frozen dessert, or cheese and crackers.

10 P. M.: Glass of hot water.

Tea, coffee, alcohol, tobacco—all carry a certain menace to the circulation and should be avoided where early organic change exists. Caffeinless or cereal coffee are preferable.

The foods containing appreciable amounts of purin are as follows:

Sweetbread, liver, beef, chicken, loin of pork, veal, ham, mutton, salmon, halibut, plaice, cod, beans, lentils, oatmeal, asparagus, onions, porter, ale, lager beer, coffee, tea.

The purin-free foods are as follows:

Milk, cream, butter, cheese, eggs, mutton fat, veal fat, rice, wheat flour, white bread, cabbage, lettuce, fruits.

EXERCISE

While every effort should be made to get as much recreational exercise as possible, it should be borne in mind that all exercise should be graduated according to age and physical condition as ascertained by complete medical examination. All the outdoor games are, of course, helpful, especially rowing, swimming, horseback riding, baseball, tennis, and golf. Many persons, however, do not have opportunity to get such forms of exercise regularly. *Vigorous* walking is considered by many authorities as a good substitute, and an hour a day should be the least one gets. To supplement outdoor exercise one is wise to develop a habit of the regular practice of setting-up exercises such as are herein illustrated, and to give ten or fifteen minutes to them night and morning.

Fig. 27.—1. Arm Stretching—Arms stretched to full length upward and in front of body, clasping books or fists clenched tightly. Bring arms back and sidewise as far as possible. Repeat ten to twenty times.

Fig. 28.—2. Shoulder Straightening—From the standing position lean forward with book in each hand and arms extended, straighten trunk and swing arms behind the hips. Repeat ten to twenty times.

Fig. 29.—3. Neck and Shoulder Stretching—Bring head and shoulders back as far as possible, attempt to bring them still further back with a quick movement. Relax and repeat ten to twenty times.

Fig. 30.—4. Knee-chest—Clasp both hands, fingers interlocking over knee, arms at full length. Pull knee up to chest, resisting with leg. Repeat five to ten times with each leg.

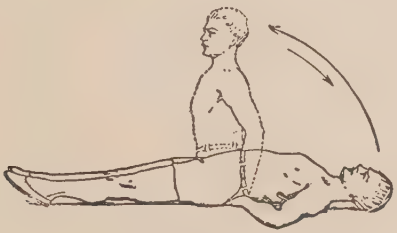

Fig. 31.—5. Trunk Bending—Lie flat on back, and rise to sitting position. Repeat five to ten times.

Fig. 32.—6. Tree Swaying—While in the standing position thrust arms straight above the head, then sway from side to side, moving from the hips upward, the arms loosely waving like the branches of a tree. Repeat ten to twenty times.

Fig. 33.—7. Full Length—Stand arm's length from wall. Place both palms against wall, then lean forward until chest touches wall. Push back to original position. Repeat ten to twenty times.

Fig. 34.—8. Toe Sitting—Rise on toes as high as possible, grasping back of chair or bed, then squat to position illustrated. Repeat five to ten times.

Fig. 35.—9. Signal Station—Start with hands on hips. Dotted line indicates the first movement. Repeat five or ten times and then repeat on other side.

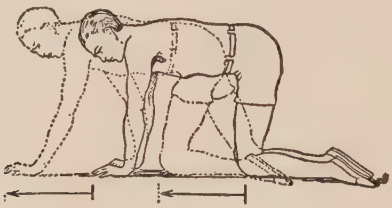

Fig. 36.—10. Crawling Position—Rest on hands and knees, thighs and arms at right angles to the body, spine straight. Reach forward with arm and follow with thigh and leg of same side; repeat on other side. Knee protectors may be worn during this exercise.

Fig. 37.—11. Body Arching—Sit on floor with palms on floor about 18 inches behind body, left leg stretched out straight, right leg flexed. Raise body to dotted line position, supported by hands and feet. Repeat ten to twenty times.

Fig. 38.—12. Body Bridge—Lie on back on floor, place feet flat on floor, and rise up on back of head. Repeat five to ten times.

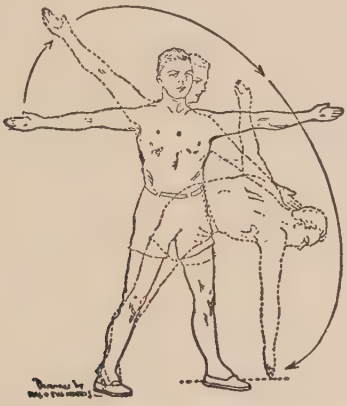

Fig. 39.—13. Windmill—Stand erect with feet about 18 inches apart, arms straight out from sides with palms up. Lower left arm and raise right arm, keeping arms stretched out straight and opposite each other, using them like the paddles of a windmill. Bring right arm over in front of face while turning the body, and bring left arm behind. Keep turning the arms and body until right hand touches the floor at outside of left foot. Then reverse. (See Fig. 40.) Repeat five to ten complete cycles.

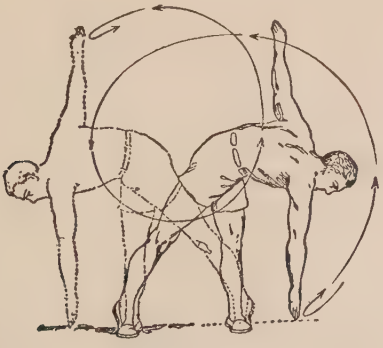

Fig. 40.—13–a. Windmill—Showing reverse movement.

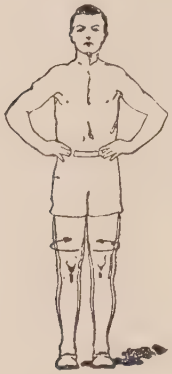

Fig. 41.—14. Flat-foot Exercise —Stand with feet parallel and somewhat apart with great toes firmly gripping the ground. Without bending the knees or moving the feet rotate the thighs outward repeatedly. This is chiefly done by strong contraction of the great muscles of the back of the thighs and buttocks, and causes a pulling up of the arches of the feet through the large tendon on inner front aspect of ankles.

Fig. 42.—15. Toe Curling—Rest on outer edges of feet, curl toes inward and backward under the feet as far as possible thirty times.

Both in standing and in sitting erect posture has been found to be a much more important factor in the maintenance of good health than is generally supposed. In an erect posture the abdominal muscles tend to remain taut and to afford proper support or pressure to the abdomen, including the great splanchnic circulation of large blood-vessels. In an habitual slouching posture, the blood of the abdomen tends to stagnate in the liver and the splanchnic circulation, causing a feeling of despondency and mental confusion, headache, coldness of the hands and feet, chronic fatigue or neurasthenia, and often constipation. A slouching attitude is often the result of disease or lack of vitality, but it is also a cause.

One should take the proper posture before beginning all standing exercises and return to it after completing them. Following is the rule for correct posture:

Stand erect, with heels about 6 inches apart and toes directed straight forward. One should imagine that he is pushing some resisting object with his chest. The body will then be in proper posture, that is, the chin will be in, the abdomen in, the chest high and well arched forward, the neck perpendicular and well stretched, the arms hanging by their own weight along the middle line of the hips.

To test the posture stand with toes touching the lower part of a door or door casing. The chest should be the only part of the body touching the door or wall, and one should be able to pass the hand between the nose and the wall.

If only a few exercises are performed one should be careful to include those that give free motion to the chest and trunk with deep breathing, and also to the lower limbs. As each movement is tried one notes the muscles that are brought into play and feels the need for developing them if they are soft or weak.

An important adjunct to formal calisthenic exercise is the special deep breathing exercise by the abdominal method as follows: Lie on the back in a well-ventilated room. On the abdomen place a weight (two or three books will do) of about 2 pounds. Relax the abdominal muscles completely and slowly draw in the air through the nostrils, allowing it to distend the abdomen and lift the weight to the highest possible point; then exhale slowly so that the time of expiration is equal to that of inspiration. Care must be taken that the weight is not lifted by closing the windpipe and straining. The movement should be accomplished while the air is heard entering the nostrils. This exercise should not be continued after fatigue manifests itself; and in any event not more than twenty minutes.

Even in youth, it is not wise to take the chances of unduly prolonged, extremely strenuous muscular effort. No one can say, even after a critical medical examination, whether there may not be some latent weakness which, under extreme physical strain, might cause some serious organic trouble or impairment.

A hot spray, followed by a cold spray and brisk rubdown, is always beneficial after exercise. If there is any history of kidney trouble or albumin in the urine cold bathing is better avoided. A tepid or cold douche or spray with brisk friction, following daily warm baths, is preferable.

It is not claimed for the exercises here presented that they are unique or have any peculiar virtue. They are, however, basic exercises which bring into play the whole muscular machinery of the body. Each person should, partly at least, invent his own system, emphasizing those particular exercises which best meet his individual needs.

When exercises are performed rhythmically, to the music of a phonograph, especially if stirring accented music is used, the whole character of the exercise is transformed from burdensome, wearisome, and distasteful routine into stimulating, inspiring, and enjoyable recreation.

SPECIAL ADJUSTMENTS OF EXERCISE

As in the case of diet, the adjustment of exercise must be considered by the physician from the point of view of pathology as well as from the point of view of improved health habits.

The exercise régime of people with organic heart disease, advanced kidney trouble, nervous symptoms, tuberculosis, is best left to specialists in the various fields and adjusted to meet individual requirements.

Following are some of the conditions that will be commonly found in any group seeking the periodic health examination:

Normal average—young.
Normal average—middle aged.
Young overweights.
Middle-aged overweights.
Middle-aged stout women.
Lightweight enteroptotic type.
Elderly lightweight type.
Simple faulty posture—drooping.
Flat-foot, bunions, faulty shoes.
Faulty posture with moderate spinal curvature.
Moderate organic heart and kidney disease and moderately increased blood-pressure.
Advanced organic heart and kidney disease.
Nervous prostration.
Pretuberculous and healed tuberculosis.

Exercise for the Young Normal Average Type.—The following exercises, which give free motion to the chest and trunk

as well as to the lower limbs, are suitable for the average normal person:

Nos. 1, 2: Arm stretching and shoulder straightening.
No. 6: Tree swaying.
No. 8: Toe sitting.
No. 13: Windmill.

The full range of exercises can, of course, be taken with benefit by this class.

Exercise for Normal Average Middle-aged Type.—As middle life approaches it is all important to keep up physical exercise, but it should be carried along certain restricted lines. Competitive games, such as tennis, baseball, football, etc., are, unfortunately, not safe for the average individual past first youth. Even a critical medical examination cannot completely exclude the possibility of latent weakness somewhere in the body, which may cause some vital part to give way under sudden, unusual effort. Inasmuch as sound health can be maintained by reasonable and moderate exercise, this is the safest line along which to carry it. Golf, horseback riding, swimming, hill climbing, walking, billiards, pool, all such exercise can be kept within bounds. As much exercise in the open air as possible should be secured because of collateral benefits entirely apart from the muscular motion. Few civilized people are able, except in early youth, to find the time for an adequate amount of this form of exercise. It is, therefore, necessary to arrange, in order to keep on the safe side, for daily, systematic, formal exercises. Here again the injunction holds good that extreme, strenuous measures should be avoided, such as very heavy exercise with dumbbells, gymnastic turning, and other exercises that make a sudden or prolonged call upon the circulation.

Among the formal setting-up exercises those appropriate to middle life are the following:

Nos. 1, 2: Arm stretching and shoulder straightening.
No. 4: Knee-chest.
No. 5: Trunk bending.
No. 6: Tree swaying.
No. 7: Full length.
No. 8: Toe sitting.
No. 10: Crawling position.
No. 13: Windmill.

Apart from these formal exercises the muscles can be exercised throughout the day by quietly contracting and relaxing them, one group after another being brought into action. This can be done at the desk during business hours or in the luncheon hour.

Exercise for the Young Overweight Type.—When there is a tendency to overweight it is important early to establish systematic habits of exercise so that the body "deformity" (for there is no other word expressing it) that finally supervenes as age advances should be avoided as well as the unquestioned injury to health that accompanies pronounced overweight. As already suggested, diet should be the main reliance, because it is obvious that the average civilized individual cannot arrange for the amount of exercise that is necessary alone to combat the tendency to overweight. Every opportunity should be sought for recreational exercise. All outdoor games may be played. Brisk walking, hill climbing, horseback riding, golf—all are healthful. But one is not likely to secure enough of such exercise to fulfil the requirements, to hold the weight in check, and keep the body in good symmetry and good trim. Hence, the habit of formal exercise should be firmly established. It is astonishing how much can be accomplished by a few minutes' faithful exercise night and morning.

When the tendency to overweight in young people is to be combated the following exercises vigorously employed will be found valuable:

Nos. 1, 2: Arm stretching and shoulder straightening.
No. 6: Tree swaying.
No. 7: Full length.
No. 9: Signal station.
No. 11: Body arching.
No. 12: Body bridge.
No. 13: Windmill.

The following exercises will be found valuable as an aid in correcting excessive girth:

No. 4: Knee-chest.
No. 5: Trunk bending.
No. 11: Body arching.
No. 12: Body bridge.

In order to combat the tendency to flat-foot, which in so

many cases accompanies overweight, exercises Nos. 14 and 15 should be employed.

Exercise for the Middle-aged Overweight.—Overweight in middle life requires very careful regulation of exercise. It is important to get as much exercise as possible, but there is danger in carrying it to extremes, as it is not possible to say what underlying organic weakness there may be. It is well to begin with moderate exercise and work up, never pushing it to the point of distressing breathlessness or profound fatigue. There should, after a brief rest, be a feeling of well-being. It is important to get all the outdoor and recreational exercise possible. Golf, hill climbing (graded and gradually increased as to its degree according to the ability of the individual), swimming (as indoor exercise), billiards, and pool are all helpful. Strenuous exercise, such as tennis, or any competitive games should be avoided. Walking is helpful if done briskly, but it does not always produce results commensurate with the time devoted to it. It is important, therefore, to arrange for systematic, regular, formal exercises night and morning.

Exercise aimed to bring the weight down should be employed in moderation—perhaps ten or fifteen times—at first, working up gradually to twenty or even forty times for certain of the simpler forms. On succeeding days the exercises should be performed with more speed as well as for longer periods.

The following are the most helpful for the middle-aged overweight type (both men and women):

Nos. 1, 2: Arm stretching and shoulder straightening.
No. 4: Knee-chest.
No. 5: Trunk bending.
No. 6: Tree swaying.
No. 7: Full length.
No. 8: Toe sitting.
Nos. 11, 12: Body arching and body bridge.

Exercise for the Lightweight Enteroptotic Type.—Where there is a condition causing a tendency to drooping shoulders, protuberant and lax abdomen, and more or less sagging of the abdominal organs special forms of exercise are required. It is true that this condition is often inherited—a sort of fundamental type—but it can be overcome by faithful attention to exercise, diet, and personal hygiene. Strenuous competitive games should

be avoided. Golf, croquet, and quiet games are permissible, but there should be first sought as much exercise on the back as possible. Swimming is one of the best forms of exercise in this condition. Long walks are not desirable until a good muscular tone has been obtained, but outdoor sleeping and as much fresh air as possible are helpful. It would be wise to sleep with the foot of the bed elevated about 6 inches. In this way the drag on the abdominal organs is relieved during sleep, and much nerve strain is avoided. Exercises Nos. 11 and 12, body arching and body bridge, will be found very beneficial. In fact, these are the fundamental exercises in this condition. They can either be performed in bed, with the foot of the bed raised, or on an ironing board with one end raised on a block so as to give an inclined plane; the point being to strengthen the abdominal muscles and to continue these exercises without any strain upon the abdominal organs, thus giving them every opportunity to be replaced. Every effort should be made by the subject to maintain correct posture. To this end Exercises 1, arm stretching; 2, shoulder straightening; and 3, neck and shoulder stretching, will be found of value.

As the muscular tone improves, greater freedom in exercise may be allowed and the exercises outlined generally employed, especially No. 13, the windmill, and No. 6, tree swaying.

Exercise for the Elderly Lightweight Type.—In later life the lightweight who is in good health has more latitude in the matter of exercise than the heavyweight of the same age, since there is less likelihood of underlying organic defect which may be adversely affected by overstrenuous physical exertion. Nevertheless it is the part of wisdom in those past middle life to be temperate in exercise, while they are at the same time faithful to it. All forms of strenuous exercise should be avoided, but swimming, horseback riding, hill climbing, walking, rowing, golf, billiards, and pool are forms of recreational exercise that can be controlled and dangerous extremes avoided.

The most helpful exercises for this type will be found in the following group:

No. 1: Arm stretching.
No. 2: Shoulder straightening.
No. 3: Neck and shoulder stretching.
No. 4: Knee-chest.

No. 6: Tree swaying.
No. 8: Toe sitting.
No. 10: Crawling position.
No. 13: Windmill.

Exercise to Correct Simple Faulty Posture.—A faulty, drooping posture is sometimes a reflection of lack of muscular tone and of nervous instability. In other cases faulty posture leads to a substandard health condition. It is important, therefore, in either case to cultivate the habit of correct posture as hereinbefore outlined.[1]

The most helpful exercises for improving the posture are the following:

No. 2: Shoulder straightening.
No. 3: Neck and shoulder stretching.
No. 6: Tree swaying.
No. 13: Windmill.

The other exercises outlined are likewise serviceable. Care should be taken always to perform these exercises from the fundamental proper standing position referred to elsewhere in this chapter.

Exercise for the Prevention or Correction of Flat-foot.—Flat-foot may be the expression of muscular weakness, lack of exercise, improper foot-gear, faulty posture in walking and standing. It may also be the cause of nervous disturbance, backache, fatigue, joint pains in hip and knee as well as foot. Conditions due to flat-foot or faulty shoes have been mistaken for rheumatism.

Flat-foot is not primarily due, as many suppose, to weakness originating in the arch of the foot, but to weakness and poor development of the muscles in the forepart of the leg, which support the arch and flex the foot and the toes on the leg, that is, pull the foot upward toward the leg. Ultimately, of course, the ligaments of the foot and the foot muscles become weakened. Flat-foot is also due to faulty posture in walking and standing, especially to the habit of toeing out, and the wearing of improperly shaped shoes or badly fitting shoes. A shoe with a straight inner edge and space for toes should be worn. Such shoes of various makes can be had of shoe dealers if *demand* is made for them. Shoes should be well fitting, not too large,

[1] See page 269.

but there should be at least $\frac{2}{3}$ inch between the end of the great toe and the end of shoe. The size should be taken when foot is firmly pressed on the ground bearing full weight of body. Shoes should fit snugly at the heel and over instep. The heels should be large enough to bear the weight without tilting and not high enough to tilt the body forward. Artificial arches and arch supports usually do more harm than good.

The fundamental difficulty is weakness of the leg and foot muscles, and this should be corrected by systematic, patient exercise. Exercise 14, most highly regarded in the United States Army, is as follows:

Stand with feet parallel and somewhat apart, with great toes firmly gripping the ground. Without bending the knees or moving the feet, rotate the thighs outward repeatedly. This is chiefly done by strong contraction of the great muscles of the back of thighs and buttocks, and causes a pulling up of the arches of the feet through the large tendon on the inner front aspect of the ankles.

Other helpful exercises are as follows:

(*a*) Stand with the ball of the foot on the edge of a board or table or similar structure, so that the toes may be freely bent downward. Bend the toes up and down over this edge thirty times twice daily.

(*b*) While standing on a flat surface lift the toes thirty times.

(*c*) Separate the toes thirty times by use of the foot and toe muscles. This may require some assistance with the hands until the trick is acquired.

(*d*) Stand with the back to the wall, heels on the ground and against the wall. Raise the front of the foot as far as possible thirty times.

(*e*) Rest on the outer margins of the feet. Curl the toes inward and backward under the feet as far as possible thirty times. (Exercise 15.)

(*f*) Marbles about $\frac{1}{2}$ inch in diameter are placed on the floor. Try to pick them up with feet by curling the toes around them.

In addition to these exercises the habit of toeing straight forward when standing or walking should be acquired. The effect of exercises to strengthen the arches is to cause the subject to walk with the weight more on the outer border of the foot than the inner border. This is also accomplished

by raising the inner side of the sole and heel of the shoes about $\frac{1}{4}$ inch. Any cobbler can do this by inserting leather strips or wedges in the sole, but the work should be inspected by a physician or, better still, by an orthopedic surgeon to prevent further injury to the feet through faulty workmanship.

Foot Hygiene.—Feet should be bathed and stockings changed daily. It is well also to change the shoes daily. In drying the feet friction with the bath towel removes the dead cuticle and promotes health and circulation. The bath may be followed by an application of oil or borated vaselin. For individuals who are troubled with perspiring feet powdering before putting on socks or stockings is efficacious.

Bathing the feet alternately in moderately hot and cold water is very beneficial in cases of flat-foot, excessive perspiration, and foot fatigue.

Corns, bunions, and foot distress are usually caused by faulty shoes. Corn cures and bunion plasters are absurd methods of correcting such difficulties. The cause should be removed. Ingrown nails are usually caused by wearing shoes that are too short, improper cutting of nails, or a combination of these causes. Nails should never be cut with round corners, but straight across, leaving the square corner projecting over the fleshy side of the nail bed. Infection with redness, swelling, and discharge require early attention by the physician or surgeon.

OVERSTIMULATION (COFFEE AND TEA)

Coffee is essentially a drug; that is, in itself it has no food value or nourishing principles. On the contrary, it affords waste matter which compels the organs of the body to do work without compensation. Its effects are mainly due to an alkaloid, caffein, which is used in medicine as a nerve and heart stimulant, although its use is being much restricted because of its uncertain effects. In this it resembles tobacco, some people being easily affected by it, others showing little effect. Caffein is now given chiefly in emergencies, and is no longer combined with headache remedies, since the Hygienic Laboratory at Washington has shown that it increases the depression or poisonous effects of such drugs.

Coffee also contains a volatile oil, caffeol, and an acid, caffeotannic acid.

Tea contains 1 to 2 per cent. of caffein, about the same proportion as in coffee. It also contains a volatile oil and a very astringent form of tannic acid.

The principal drug effects in both tea and coffee are derived from caffein, a cup of coffee containing 1 to 3 grains, and a cup of tea 1 to 2 grains. The volatile oil and extractive matter in coffee also have an irritant effect on the lining of the stomach and intestines.

The tannic acid in tea is more astringent than that in coffee. When present in any considerable quantity, as it is in tea that has been boiled and allowed to steep until it acquires a dark color, it is particularly harmful.

These acid extractives may impair digestion in those with delicate stomachs even though the caffein be removed from either tea or coffee. Yet such substances must be regarded as much less harmful in their effects than so powerful a drug as caffein, which exercises a positive action on such important organs as the heart, brain, and nervous system. These effects vary in degree according to the condition of the heart, brain, and nervous system of the individual.

The effects of moderate indulgence by healthy subjects are as follows:

As coffee is a true stimulant, its effects are the opposite of those of alcohol; it stimulates the higher brain functions, causing increased mental activity and muscular activity. The mind becomes clear and its perception more acute, but it is also alleged that the depth of thought is not increased.

Laboratory experiments show that apparently there are no ill-effects noted on the days following moderate stimulation with coffee. On the other hand, ill-effects are invariably noted on days following moderate indulgence in alcohol. In a healthy, sound individual doses equivalent to one strong cup of coffee produce no noticeable ill-effects, except slight nervousness. Doses equivalent to one and a half cups of coffee, however, produce marked unsteadiness on muscular and mental work.

The ill-effects which may in the long run be produced by this powerful drug taken habitually for many years, even by

the supposedly healthy, have never been measured, but it is not uncommon for people who have taken coffee and tea for many years without apparent ill-effects suddenly to develop a susceptibility to these drugs, suggesting that there has been a slow damage to the nervous mechanism of the heart or to some other part of the nervous system.

For those who wish to lead the ideal hygienic life, coffee and tea are not recommended, except for purely medicinal purposes and when prescribed by a physician.

When muscularly fatigued a bath or a rub-down is far better than drugs.

When mentally fatigued, rest and sleep is the remedy, not stimulants. Anything that merely masks fatigue is, in the long run, fraught with a certain risk.

Whatever may be thought regarding the moderate use (one cup of coffee and one cup of tea daily) by those with sound circulation and strong-fibered brain and nervous system, there can be no doubt that it is unwise even for the healthy to take large quantities, and there can be no doubt that tea and coffee are distinctly harmful, even in moderate amounts, to individuals suffering from dyspepsia, sleeplessness, nervousness, heart affection, and those who have inherited a tendency to nervous and mental irritability. Many suffering from acid dyspepsia, insomnia, and nervousness secure complete relief after giving up tea and coffee.

Dr. Hale Powers, of the Neurological Department of the Massachusetts General Hospital, has reported the presence of a coffee syndrome apparently unrelated to the caffein effect, as the symptoms clear up when coffee is replaced by tea. These effects are ascribed to some unidentified toxic principle in the fats, waxes, and glucosids. The syndrome is characterized by nervous and mental irritability, vertigo, and headache.

The fact that coffee, in doses sufficient to produce any stimulating effect, raises blood-pressure and stimulates the action of the kidneys is also good reason for using it with caution in these days of arterial strain and tendency to kidney affection. Nowadays drugs that act on the kidneys are used by physicians with great caution. Instead of spurring the kidney with drugs its work is regulated by proper diet, water intake, etc. A recent investigation of a group of 1000 cases of high blood-press-

ure showed that excess of tea and coffee was one of the outstanding factors in this group.

The ill-effects of tea and coffee indulgence can be lessened if care is taken in making these beverages. Neither tea nor coffee should be boiled. Boiling water may be allowed to percolate through coffee or be poured over tea, which should steep only long enough to extract the essential oils which give the flavor to these beverages. Boiling drives off the oils and extracts the acid constituents, making the beverage injurious to the stomach.

ALCOHOL

In the Medico-actuarial Investigation, including 43 American life insurance companies, the combined experience on users of alcohol extending over a period of twenty-five years has been compiled, with interesting results. The death rate among certain types of drinkers was compared with that among insurance risks generally. The results (supported by the evidence derived from British companies) follow:

First: Those who were accepted as standard risks, but who gave a history of occasional alcoholic excess in the past. The mortality in this group was 50 per cent. in excess of the standard mortality, equivalent to a reduction of over four years in the average lifetime of the group.

Second: Individuals who took two glasses of beer, or a glass of whisky, or their alcoholic equivalent, each day. In this group the mortality was 18 per cent. in excess of the standard.

Third: Men who indulge more freely than the preceding group, but who were considered temperate and acceptable as standard insurance risks. In this group the mortality was 86 per cent. in excess of the standard.

Thus we find among alcohol users the following increases of mortality over the standard or average death-rate among insured risks generally:

	Death-rate in excess of standard.
Steady moderate drinkers, but accepted as standard risks	86 per cent.
Having past excesses	50 "
Very moderate drinkers	18 "

In these groups the death rates from Bright's disease, pneumonia, and suicide were higher than the normal.

The experience of the Northwestern Mutual Life Insurance Company is consistent with the evidence derived from other life insurance sources. A study covering 286,392 policies issued in 1885–1900 (exposed to 1915) showed the following:

Taking the death rate in Group A, composed of total abstainers, as 100, the death rate in group B, moderate users, was 115. The death rate in Group C, regular beer drinkers, was 132; and the death rate in Group D, regular spirit drinkers, was 141.

If there were no direct experimental evidence as to the effect of alcohol on the body the figures quoted might be open to question, and the association of alcohol with a high death rate might be looked upon as accidental. But the knowledge gained from the laboratory not only in experiments on animals but on man himself shows that a higher death rate among alcohol users is what we would naturally expect to find in the light of what is known regarding the effects of alcohol on the human body. These may be briefly summarized as follows:

Alcohol is no longer regarded as a brain stimulant, but as a narcotic. This narcotic influence is first exerted on the higher reasoning powers that control conduct, so that the lower activities of the mind and nervous system are for a time released. This and a brief local effect on mouth and throat and stomach explain the apparent stimulation. The every-day well-poised, self-controlled man goes to sleep, as it were, and the primitive man temporarily wakes up.

Exhaustive and delicately controlled experiments by Dodge and Benedict in the Nutrition Laboratory of the Carnegie Institute show that alcohol, even in beverage doses, is a uniform and consistent depressant, impairing the protective nervous mechanism of the body.

The complex constituents of the blood that arise to defend the body when it is attacked by disease are unfavorably affected by alcohol. Even small doses have been shown to lower resistance to such diseases as septicemia, pneumonia, and typhoid fever.

For many years alcohol was used as a heart stimulant in acute and chronic disease. Only in rare instances is it now so used, and chiefly in subjects who are accustomed to its use, who must be treated as drug habitués and not deprived of the drug influence to which the body has become adjusted. Alcohol in the amounts formerly used as a heart stimulant is undoubtedly a heart depressant.

Benedict's recent experiments positively show that alcohol decreases the efficiency of the heart. It takes off the brakes and does not give strength to the heart.

Such benefit as alcohol has conferred in acute disease has been due largely to its rapid utilization as a temporary food. It can be burned in the body as fuel, thus sparing the tissues. For a brief time it can take the place of energy foods such as fats and sugars, but there is grave risk in using it for such purposes in view of its effects on the heart and nervous system. While it makes body heat, it also causes a loss of body heat through its action on the blood-vessels. There are other ways to nourish and support the acutely ill without these attendant risks.

In connection with life extension work it is not wise to "condemn" alcohol arbitrarily and dogmatically, but simply ask for respectful consideration by reasonable people of the evidence pointing to life damage through its use.

TOBACCO

In view of the well-known effects of tobacco on the heart and circulation it is important to consider the possible cost of this indulgence to the individual. It is not always possible to determine years in advance whether or not one is endowed with sufficient resistance to render so-called moderate smoking harmless. As a matter of precaution, however, an inveterate smoker should, above all others, protect himself by the periodic physical examination, in order to ascertain whether or not his indulgence is affecting the circulation.

The fact that the degenerative diseases of the heart and circulation are increasing in this country, and that the per capita consumption of tobacco is likewise increasing, should receive serious consideration. In the effort to check these maladies it would seem that cutting down tobacco consumption is one of the important measures that could be adopted.

Tobacco and its smoke contain powerful narcotic poisons. Attention is called to the fact that one of the substances abundantly present in tobacco smoke is carbon monoxid. Carbon monoxid affects the red blood-cells, displacing the oxygen from their hemoglobin. It has been found that tobacco smoke may have from 7.2 to 25 parts of carbon monoxid in 10,000 parts of air.

In a study of 5000 people taking the periodic health examination service, who used tobacco to the extent of 4 cigars, or 9 cigarettes or 9 pipefuls daily, or more, the following conditions were found:

Those showing important to serious impairments requiring medical supervision were 10 per cent. in excess of those similarly classified in the general group.

The relationship of tobacco to certain special impairments is shown as follows:

	Excess among tobacco users.
Thickened arteries	6 per cent.
Rapid pulse	15 "
Decayed teeth	15 "
Gum recession	13 "
Marked pyorrhea	27 "

(No apparent relationship between tobacco indulgence and high blood-pressure was found.)

It is often claimed that tobacco smoke tends to prevent mouth infection. The contrary is true, as above shown. Tobacco evidently lowers the resistance in mouth tissues just as it does in the throat and bronchial tubes.

CARE OF THE MOUTH AND TEETH

Infected gums, teeth, tooth sockets, or tonsils may poison the whole body.

The teeth should be cleaned after each meal if possible, but especially they should be cleaned at night before retiring and the first thing in the morning.

The outer surface of the teeth should not be cleaned like this,

but with a circular motion, like this:

The inner surface may be cleaned with a back-and-forth motion.

At least two minutes should be taken to clean the teeth.

The tongue as well as the teeth should be cleaned. The subject should pull the tongue forward with napkin or clean handkerchief and clean the root with tongue scraper or tooth-brush and soap.

Strong antiseptic washes are harmful.

The tooth-brush is a mighty weapon in protecting the individual against disease, but it should be remembered that it can be misused to the injury of the gum. A medium brush should be used.

The occasional use of precipitated chalk and the daily use of pure soap as a dentifrice will be found efficacious in mouth hygiene.

The soft deposits that precede tooth decay can be brushed off when first deposited. They cannot accumulate and promote decay if the teeth are properly and regularly cleaned.

To make certain the subject should visit the dentist every three to six months for careful inspection and necessary treatment.

Cavities ought not to form in well-cared-for teeth, but few teeth are always well cared for.

The dentist should watch for small cavities. The person should not wait for toothache.

If gum infection, or root infection, or pyorrhea exist and cannot be cured, it is better for the subject to have the teeth removed than to suffer ill health.

The diet of the expectant mother and of the growing child has an important influence on the destiny of the permanent teeth. We know that all the important food factors are included in a diet in which there are liberal quantities of milk, green vegetables, whole cereals, and fruits. We know that a diet composed largely of meat, bread, potatoes, sugar, and fat is woefully deficient both in minerals and vitamins.

Exercise of the teeth and gums is important. Just as we do setting-up exercises, gymnasium work, and employ chest weights and rowing machines to simulate the former activities of primitive man, so must we contrive some means of exercising our teeth and jaws as a substitute for the work formerly imposed

upon them. This can be attained by the free use of crusts and hard fibrous foods.

FOCAL INFECTION

By focal infection is meant a collection of germs; that is, bacteria at some point in the body which multiply and produce poisons. The poisons and even the bacteria are absorbed into the blood-stream and lymphatic system or penetrate the tissues, and necessarily exert a very marked and harmful influence upon the whole body.

So-called rheumatism, neuritis, sciatica, neuralgia, lumbago, and practically all ailments of this nature have in a large percentage of cases been found to be secondary to focal infection.

In the light of present knowledge on the subject it is readily appreciated that the old remedies failed because the real cause of the trouble was not removed. The modern physician approaches the treatment of such disorders very differently. He makes a thorough examination aided by *x*-ray and laboratory tests in search of a possible focus of infection.

In a very large number of cases prompt relief follows the removal of the source of the poison. Unfortunately, it does not occur in all cases because changes in body tissue may have developed, and removal of the focus of infection is not enough to restore the structure to normal, although it does prevent further progress of the disease condition. It remains for the physician to apply or recommend other treatment, which is varied, and may be medical or hygienic.

There are certain medicinal agents which relieve pain and favor elimination, and the same is true regarding the physical agents—heat, massage, baths, electricity, etc. In very severe cases where extensive changes have occurred it may only be possible to improve the condition, but even such a result is welcome to a sufferer from these affections.

The chronic changes in the heart, kidneys, and blood-vessels which are very much on the increase are, to a large degree, the results of focal infection. Either high blood-pressure or low blood-pressure may be due to this cause.

The commonest sites for the development of focal infection are the roots of the teeth, tonsils, middle ear, and cavities in the skull communicating with the nasal passages. Less frequent

sites are the genito-urinary organs, gall-bladder, appendix, intestinal tract, diseased joints, wounds of long standing, especially those involving bone.

Infections locate in the tooth cavities and tooth sockets and may exist for years without the knowledge of the individual. It is, in fact, the unusual thing for attention to be directed to a tooth socket on account of any symptoms referable to the tooth itself. By far the greater number of such conditions are revealed as the result of an *x*-ray examination.

An *x*-ray examination of the teeth is a wise precautionary measure for all individuals and in all cases where extensive dental repair or pulpless teeth are present. Such an examination is regarded as imperative in all persons complaining of rheumatism, rheumatic pains, neuritis, sciatica, lumbago, etc., and all cases showing circulatory irritation, kidney irritation, or evidence of disturbance in thyroid secretion.

Experience shows that pulpless teeth must be regarded as potentially menacing to health, because it is at the roots of such teeth that infection is most frequently found. Therefore a pulpless tooth must be looked upon as a doubtful health asset. Instead of giving the benefit of the doubt to the tooth, therefore, it is in the interest of health and longevity to give the benefit of the doubt to the whole body.

It might be said that there are four degrees of risk involved. In the order of their importance they are: (1) pulpless teeth without evidence of infection; (2) pulpless teeth without local evidence of infection, but accompanied by rheumatism or other lowered health condition; (3) pulpless teeth with *x*-ray evidence of infection; (4) pulpless teeth with evidence of root infection accompanied by rheumatism or lowered health condition. No dentist can tell by physical observation of the teeth whether or not root infection exists. Root infection of pulpless teeth may even exist and not be shown by the *x*-ray. If pulpless teeth are retained their roots should be examined by the *x*-ray at least once a year. The fact being established that a tooth is pulpless and shows *x*-ray signs of infection, the decision as to its removal is not a local dental problem, but one in preventive and clinical medicine involving the well being of the whole body.

In a study of 20,000 unselected complete dental *x*-rays taken as a matter of routine in connection with the periodic

health examination, it was found that 63 per cent. of the group showed definite signs of root infection. The greater number of these sought dental treatment. Considerably more than half of those so treated reported diminution of symptoms and definite improvement in health within six months.

The tonsils are very frequently the site of focal infection. They may appear normal on superficial examination and be found to be extensively diseased when examined after removal. In a large number of cases, however, the tonsils show external evidence of harboring infection. Cultures from the tonsils sometimes aid in determining whether or not they are harboring infection. In all cases where the tonsils appear diseased their removal should be considered, except, of course, when there is undue risk, as in diabetes, or old age, in which case some less radical procedure may be adopted. These palliative measures, however, are, as a rule, not nearly so satisfactory as removal. Unfortunately, there is a large number of persons who supposedly have had their tonsils removed, but who, on examination, show the presence of diseased tonsillar tissue. This is due to the fact that a small portion of the tonsil was left at the time of operation. The lingual tonsil, or mass of lymphoid tissue at the root of the tongue, is often the seat of infection quite as important as that affecting its neighbor—the faucial tonsil. Thorough examination of this region by a throat specialist is a wise measure. Final opinion as to removal should always be secured from a specialist. Here again the problem is not a local one, but one that should be solved in the interest of the whole body.

Search for chronic infection in ear and nasal cavities should always be made and such infection eradicated. The same principle applies to these regions as to other sites of focal infection. An analysis of the records of a group of 16,000 people physically examined showed a definitely higher ratio of high blood-pressure cases among those with focal infection in the head.[1]

Chronic infection in the reproductive organs resulting in poisoning of the whole body is fairly frequent. It occurs in both sexes and is very often the result of former acute infection

[1] Physical Defects as Revealed by Periodic Health Examinations, by Louis I. Dublin, Eugene Lyman Fisk, and Edwin W. Kopf, Amer. Jour. Med. Sci., October, 1925, p. 576.

which in most cases has been of a very severe grade. Physical examination will usually serve to reveal such conditions, although in some cases special instrumental examinations and laboratory tests are valuable aids.

The gall-bladder, appendix, and intestinal tract are sometimes the site of focal infection. In many cases of this nature there are definite digestive disorders that direct attention to these points, and the diagnosis of such conditions can usually be made by summarizing the data obtained on physical and *x*-ray examination, together with the history, and by the process of elimination.

Wounds of long standing, particularly those involving the bones, present conditions favorable for the absorption of bacterial poisons into the blood-stream. These conditions are, of course, evident and should be eliminated.

Infected joints are not infrequently sites of focal infection, and these may also be secondary to some other primary focus. By that is meant that an infected tooth root or tonsil may be the source from which a joint is infected by means of transmission of germs through the blood-stream.

Needless to say, any focus of infection in the body is a serious menace to health and should be removed. This we believe to be an additional argument in favor of the periodic health examination, for it is only in this way that the whole body is thoroughly investigated and such conditions revealed. Unfortunately, chronic focal infection of mild degree may exist for years without the subject becoming conscious of it until serious damage is done.

It should be borne in mind that removal of a focus of infection is important not only for the cure of existing trouble but also for the prevention of future trouble.

The influence of focal infection in causing functional nervous and mental derangement has probably been much exaggerated. Carefully controlled experiments by Kopeloff and Kirby,[1] of the New York State Psychiatric Institute, failed to reveal any influence on the course of functional psychoses. These authors concede the importance of removing foci of infection in such cases in the interest of the general health, but there appears to

[1] Focal Infection and Mental Disease, by Nicholas Kopeloff and George H. Kirby, Amer. Jour. Psych., October, 1923, vol. 3, pp. 149–197.

be no specific causative relation between such foci and functional mental troubles.

THE PREVENTION OF COLDS

In many persons the susceptibility to colds is due to abnormalities in the nose or throat. Nasal obstruction is a very common condition. The nose, like the eye, is usually an imperfect organ. These obstructions are often the result of adenoids in childhood, which interfere with the proper development of the internal nasal structures. Malformation of the teeth and dental arches in childhood are frequent and often neglected causes of nasal obstruction. Such malformations are due to arrested growth of the upper jaw and nasal structures. Correction of the deformity of the dental arches often renders nasal surgery unnecessary.

Such conditions not only predispose to colds, but increase their severity and the danger of complicating infection of the bony cavities in the skull that communicate with the nose. They also increase the liability to involvement of the middle ear and of the mastoid cells which are located in the skull just behind the ear. The importance, therefore, of having the nose and throat carefully examined, and of having any disease condition of the mucous membrane or any obstruction corrected, must be apparent. All who suffer from recurrent colds should be advised to take this precaution before the winter sets in.

Bacteria play a part in most colds. In some cases there is a general infection, with local symptoms, as in grip; in others there is a local infection, with a mixed class of bacteria. It is probable that these various forms of bacteria are constantly present in the nasal secretion, but do not cause trouble until the local resistance or the general resistance is in some way lowered.

It is a familiar fact that exposure and chilling will often produce a cold. This is usually due to the fact that the nerve centers controlling the circulation of the skin are oversensitive, and exhibit a sort of hair-trigger reaction to exposure, causing a disturbance of the circulation, and of the heat-regulating machinery of the body of which the spongy shell-like turbinated bones in the nose are an important part. Skin training, therefore, is necessary to establish resistance to colds.

Cool bathing, to a point that produces a healthy reaction, is an important feature of skin training.

Cold bathing by those affected with kidney trouble is not advisable, but delicate individuals, who cannot react well to the cold bath, can greatly increase their resistance by graduated cool bathing performed as follows:

Standing in about a foot of hot water the body may be briskly rubbed with a wash cloth wrung out of water at about 80° F. and reduced day by day until it is down to 50° F. Following this the cold douche or affusion (water quickly dashed from a pitcher) may be taken beginning at 90° F. and daily reducing until 50° F. is reached, or an agreeable reaction ceases to follow.

The wearing of loose porous clothing and the air bath—exercise in a cool room without clothing—are also valuable measures in skin training. Very heavy wraps and fur coats should be worn only during unusual exposure, as in driving or motoring. Outer clothing should be adapted to the changes in the weather, and medium-weight underclothing worn throughout the winter season. Office workers and others employed indoors are, during the greater part of the day, living in a summer temperature. The wearing of heavy underclothing under such conditions is debilitating to the skin and impairs the resisting power.

Overheated rooms should be avoided for the same reason. In rooms where people are moving about the temperature should not be allowed to rise above 65 degrees. In ordinary offices or dwelling rooms the temperature should not be allowed to rise above 68 degrees, and adequate ventilation should be provided.

Constipation predisposes to colds, and should be vigorously combated by proper diet and exercise and regular habits of attention to the bowel function.

Overeating also frequently leads to nasal congestion.

The use of nasal douches is not advisable except as prescribed. The mucous membrane of the nose is intolerant of watery solutions, and a chronic congested condition or even infection of air cavities in the skull can be brought about by the constant use of sprays and douches. When the nose is clogged with soot or dust, a very gentle spray of a warm, weak solution

of salt and water in the anterior nostrils may do no harm. Picking of the nose should be strictly avoided. This is probably a fertile cause of infection. In blowing the nose care should be taken to close one nostril completely and to blow through the other without undue force. Otherwise, infection may be carried into the ear passages or the cavities communicating with the nose and give rise to serious trouble.

When suffering from a cold, gauze or cheesecloth should be used instead of a handkerchief and burned after use. A person should be careful to sneeze into the gauze, and thus avoid spraying infection into the surrounding atmosphere.

The most effective home remedies are the hot foot-bath, 110° to 115° F., a hot drink (such as hot flaxseed-tea), a thorough purge, and rubbing the neck and chest with camphorated oil. The hot foot-bath should usually last about twenty minutes and be taken in a very thorough manner—the body enveloped in a blanket. After taking the bath the person should go directly to bed, and not move about and neutralize its good results.

The subject should be warned against the use of quack remedies and so-called catarrh cures. Whisky and heavy doses of quinin are distinctly deleterious and should be avoided; there are more effective remedies that carry no possibility of harm.

A level teaspoonful of ordinary baking soda dissolved in a wineglassful of water taken as a dose every three hours at the outset of a cold has been advised by good authorities. Another soothing and harmless method of relieving nasal congestion is to drop rather freely into each nostril with an eye dropper liquid vaselin or albolene. These contain no drug that could irritate the inflamed surfaces. It could be done two or three times a day, subject to the approval of the physician. Medical treatment by a physician can always mitigate and shorten the duration of a cold and lessen the danger of complications.

There is little doubt that certain manifestations of the common cold, such as congestion in the head and running at the nose, are purely physical reactions due to chilling of the body. Whether or not such a condition passes over into an infective cold depends on the condition of the individual and probably largely on the type of bacteria already present in his nasal cavities and throat.

The practice of having the nose and throat treated by a specialist at frequent intervals during the winter season should be encouraged. While it may not be possible to render these areas sterile, still the condition of many individuals is such that undoubtedly more thorough-going attention to throat conditions from this standpoint would not only protect the person so treated, but perhaps protect the community from these individuals as carriers of bacteria. There should be a realization of the menace of defective tonsils and of chronically infected throats. The importance of vaccination against smallpox and immunization against typhoid fever is generally accepted, but millions of people carry these sources of infection in their upper air passages and only give them attention when the conditions become immediately menacing.

MENTAL HYGIENE

The chief characteristic of minor mental disorders is the lack of a sense of proportion displayed by the sufferer. Often he is introverted—that is, he sees himself as a sort of moving picture scenario. He withdraws from the busy world of affairs where life moves quickly and automatically in response to the demands made, and devotes himself to a study of his psychic and mental states, often with vast admiration and grandiose magnification. Such people need to be extroverted—that is, their attention directed to the outside world.

Many profound nervous disorders—neurasthenia, hysteria, and the like—are, of course, more readily developed in people with poor nervous and mental endowment at birth. Yet many people with average family histories are more or less unstable in their nervous organization. If the strain is sufficient they lose their poise and drift into pitiable conditions of chronic ill-health and life failure. Students of nervous diseases have called attention to the fact that serious nervous disorders, characterized by such conditions as sudden deafness, loss of speech, periodic vomiting, insomnia, loss of memory, sleep walking, paralysis (not due to injury or hemorrhage of the brain), as well as that vague collection of fears, anxieties, and will-failure termed neurasthenia, are due to the effort of the individual to escape from some intolerable situation. Life struggle presents itself to them as a hopeless battle and they seek refuge

in their nervous maladies. They escape from that grip with life which every organism and every race must take if it is to survive. These sufferers are, of course, not conscious of this underlying motive.

When we analyze states of unhappiness we find that, as a rule, they arise from preventable causes—undisciplined acts, faulty mental attitudes, mistaken notions as to the attitude of others toward ourselves, and underlying even minor mental disorders we find the tremendous factor of fear.

Modern neuropsychiatrists lay varying emphasis on the factor of emotional repression, the putting aside as it were into some chamber of the brain the vivid recollection of a distressing incident or experience. This is not really forgetting, but the actual treasuring up in the psyche of a state of suffering or remorse or dissatisfaction instead of a release and real forgetting —or, as the emotional release is technically called—a sublimation of the material of distress or of the repressed emotions.

Psycho-analysis is built on this theory. It is a method of treatment dangerous in the extreme in unskilful hands, both to patient and operative; but it has a place in mind cure. It is not a field that can be covered by the "parlor psycho-analyst," but by a patient and highly gifted physician.

The basis of most nervous disturbances which do not have their origin in actual tissue changes or tissue injuries, as in the case of infections, is not fear, in exactly the popular sense of the word, but, as already expressed, rather a retreat from difficulty under such conditions that the individual is not conscious of the fact that he is guilty of retreat. In such cases it is important for the physician to impress forcibly upon the subject the fact that, after a thorough physical examination has revealed no organic or physical cause for nervous disease, there is an obligation on the part of the individual to measure up to life struggle and not to take the avenue of retreat. If it were more clearly understood that a bold front to the enemy will cause him to retreat, there would be less nervous failure.

It is an interesting and significant fact that in the treatment of cases of so-called war shell shock, stress was laid upon productive occupation. These sufferers were given something useful to do, and in adapting themselves to real work they regained their hold on life. There were very few cases where a prolonged rest-

cure was required. This raises the old question as to whether a healthy man can really be overworked. Of course, there can only be one sensible answer to such a question. Undoubtedly overwork can break down the mind and nervous system, but it is astonishing how much work a well-cared-for body and mind can carry through. Poor mental government and a faulty attitude toward life, rather than overwork, bring about mental and nervous breakdown. Often the work itself is not so much responsible as the lack of balance to the work, improper recreational habits, and the absence of interest in something that is worth while doing. Frequently the cause lies in surrendering to anxieties, fears, and obsessions, instead of casting them out into the open, where in the full light of day they are found to be ridiculously insignificant and unimportant.

Professor Burnham,[1] in a recent able discussion of the components of the normal mind, groups the following factors as necessary to mental health:

Attention to the present situation; as Osler has expressed it, "living one day at a time."

Attention in times of crisis and in dangerous exercises.

Avoidance of caution which merely reflects worry.

The child should be a new being daily.

The power of orderly association.

The desire for serenity as a basis for convention.

Mental work and the impulse to activity.

Alternation of work and rest.

Rhythm in human activities—normal reaction to feeling, excitement within certain limits—vigorous explosion of nervous energy seems necessary for health.

Free speech is a safety valve and no doubt prevents nervous disorders.

Repression is a cause of fear. Civilized life is accompanied by many repressions which impose much nervous strain. A repressed complex of emotional associations acts as a foreign body in consciousness.

An active attitude is a component of mental health. Face difficulties actively. Face realities, but control impulses.

[1] The Normal Mind, by William H. Burnham, New York, D. Appleton & Company, 1925.

Cultivate normal social relations. Man is a gregarious animal.

Avoid an introverted existence. Seek balance and adjustment to the demands of existence.

Have a normal sense of dependence on a Supreme Being, or on normal law, or in one's sense of honor or ideals.

Professor Burnham is in agreement with the following practical and sound rules for mental hygiene presented by Riggs[1]:

Neither run away from emotions nor yet fight them.

Be efficient in what you do. Do not drive your tacks with a sledge-hammer.

Do one thing at a time.

Make clean-cut practical decisions.

Do not accept hurry as a necessary part of modern life.

The worst enemy of efficiency, as well as the best ally of nervousness, is worry. Worry is a complete circle of inefficient thought whirling about a pivot of fear.

Keep work, play, rest, and exercise in their proper relative proportions.

When a decision has been reached, when something has to be done, waste no time in mobilizing extra energy—just do it.

Lastly, to avoid breaks in character, breaks between your ideals and your every-day actions, recognize that your problem is fundamentally the same as everyone's else, no matter what your particular job may be. Do not criticize your part in the play, study it, understand it, and then play it, sick or well, rich or poor, with faith, with courage, and with proper grace.

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APPENDIX

Section 19

IMPAIRMENTS REVEALED IN AVERAGE GROUPS THROUGH PERIODIC HEALTH EXAMINATIONS

As pointed out in the Introduction, the efficiency of the periodic health examination will be materially influenced by the point of view of the examiner.

What can be accomplished in the way of actual life saving when the physician approaches this work from the point of view of *life extension* is suggested by the results of an analysis made by the Metropolitan Life Insurance Company of the policyholders periodically examined by the Life Extension Institute in 1914–15. It was demonstrated through the medium of an actuarial study that upon the whole group there was a reduction in mortality of 18 per cent., while in the elderly groups there was a reduction of more than 50 per cent. These findings have been confirmed by subsequent investigation made by the insurance company and extended to cover a nine-year period. A similar study covering a ten-year period made by the Guardian Life Insurance Company shows a reduction in approximately the same ratio (23 per cent.) in the death rate of policyholders taking these periodic health examinations.

Unless the physician fully appreciates the extent of physical impairment that exists among so-called healthy people, he may fail to search with a proper degree of industry and intensity for early signs of trouble in the various regions of the body. Consideration of the results of examinations of large groups of people will be of value in this connection.

The following tables based upon the examination of two groups of business men are presented because the percentages are typical of the degree of impairment found in average groups in the population:

(300 New York Business Men)

Class.	Per cent.
1. No physical defects or errors in hygiene	0
2. Very minor defects requiring attention or observation	4
3. Minor defects requiring hygienic correction, or minor medical, surgical, or dental attention	21
4. Moderate defects requiring medical supervision as well as hygienic correction. Impairment influencing longevity	61
5. Advanced physical impairments requiring systematic medical or surgical attention	9
6. Serious physical condition requiring immediate medical or surgical attention	5

(Average rating—Class 4.)

(328 Boston Business Men)

Class.	Per cent.
1. No physical defects or errors in hygiene	1
2. Very minor defects requiring attention or observation	6
3. Minor defects requiring hygienic correction, or minor medical, surgical, or dental attention	15
4. Moderate defects requiring medical supervision as well as hygienic correction. Impairment influencing longevity	62
5. Advanced physical impairments requiring systematic medical or surgical attention	10
6. Serious physical condition requiring immediate medical or surgical attention	6

(Average rating—Class 4.)

Insurance Health Service

The percentage of persons in specified age groups showing important physical impairments is suggested by the following table. These figures are based on studies of 16,662 policyholders examined throughout the United States for the Metropolitan Life Insurance Company.[1]

Percentage of Persons in Specified Age Group Showing Important Physical Impairments

(Based on studies of 16,662 policyholders examined throughout the United States by the Life Extension Institute for the Metropolitan Life Insurance Company.)

[1] Physical Defects as Revealed by Periodic Health Examinations, by Louis I. Dublin, Eugene Lyman Fisk, and Edwin W. Kopf, Amer. Jour. Med. Sci., October, 1925, p. 576.

Impairment.	All ages.	Under 25.	25 to 34.	35 to 44.	45 to 54.	55 and over.
PERSONS IN SPECIFIED AGE GROUP:						
Number	16,662	861	5,885	5,799	3,023	1,094
Percentage	100.0	100.0	100.0	100.0	100.0	100.0
BUILD, POSTURE, AND WEIGHT:						
Faulty posture	19.1	16.4	16.9	19.1	20.8	29.1
Spinal curvature	5.2	7.0	4.9	5.2	4 8	5.9
Flat-feet	16.4	16.8	17.0	16.6	15.4	13.7
Over 20 per cent. underweight	2.4	2.0	3.2	2.3	1.5	2.1
Over 20 per cent. overweight	12.9	4.9	8.1	14.4	18.9	19.8
EYES, EARS:						
Defective vision corrected	25.4	15.2	18.4	21.8	38.3	48.7
Defective vision uncorrected	29.5	28.3	28.9	30.0	29.4	31.8
Otitis media; discharging ear	1.2	2.0	1.3	1.0	1.2	0.5
NOSE AND THROAT:						
Deflected septum—slight	22.8	24.5	24.5	23.0	19.9	19.2
Deflected septum—marked	2.7	2.6	2.8	3.1	2.4	1.4
Enlarged, septic or buried tonsils	26.2	34.0	32.8	25.6	17.1	13.0
Nasopharyngitis, chronic	5.5	4.9	6.0	5.4	5.0	4.4
Nasopharyngitis, acute	5.5	6.5	5.5	5.5	5.0	6.2
Hypertrophic rhinitis, enlarged turbinates	14.8	19.0	16.9	15.1	10.7	10.1
TEETH AND ROOT INFECTION:						
Carious teeth; septic roots	8.5	.6.4	7.9	8.1	9.2	13.0
Slightly infected gums	10.3	3.6	7.3	11.1	14.7	16.4
Pyorrhea—definite	4.8	1.2	2.7	5.7	7.1	7.4
Heavy dentistry—*x*-ray advised	41.8	30.0	40.7	44.2	43.5	38.8
HEART AND PULSE:						
Functional murmur or irregularity	6.0	6.9	5.5	5.5	6.3	9.3
Mitral murmur—stenosis	0.2	0.2	0.2	0.1	0.2	0.4
Mitral murmur—regurgitation	0.7	0.3	0.7	0.5	0.9	1.5
Aortic murmur—stenosis	0.1	...	0.1	0.1	...	0.2
Aortic murmur—regurgitation	...	...	...	...	0.1	0.1
Enlargement	2.7	1.7	2.1	2.0	3.7	8.2
Slow pulse—below 58	1.4	1.4	1.0	1.4	1.7	1.9
Rapid pulse—above 90	8.3	10.9	8.2	8.2	8.6	6.7
Intermittent pulse—extrasystoles	0.5	0.2	0.4	0.4	0.8	1.7
BLOOD-VESSELS AND BLOOD-PRESSURE:						
Normal condition of blood-vessels	77.4	89.5	83.6	76.6	71.6	55.2
Slight arterial thickening	14.3	7.2	10.9	14.9	18.2	24.0
Moderate arterial thickening	4.6	2.0	3.1	3.9	6.5	13.6
Marked arterial thickening	0.6	0.1	0.4	0.3	0.7	3.7
Blood-pressure—15 to 25 below average	9.9	7.6	7.9	10.9	12.1	10.2
Blood-pressure—25 or more below average	2.4	0.6	1.3	2.9	3.3	4.3
Normal blood-pressure	80.5	86.9	85.9	80.6	74.4	62.4
Blood-pressure—20 to 40 above average	6.2	4.6	4.6	4.9	8.3	16.3
Blood-pressure—40 to 60 above average	0.7	0.1	0.2	0.5	1.1	4.3
Blood-pressure—60 or more above average	0.3	0.1	...	0.1	0.7	2.3
STOMACH; ABDOMINAL ORGANS:						
Constipation	39.7	34.6	39.5	40.4	40.1	40.3
Tenderness over liver and gall-bladder	0.6	0.1	0.4	0.8	0.9	0.7
Tenderness in region of appendix	2.3	1.7	2.5	2.5	2.1	1.6
Hemorrhoids	12.3	4.4	9.3	12.8	17.7	16.3
ABDOMINAL ORGANS—INGUINAL REGION:						
Weak inguinal rings	5.9	5.8	5.9	6.0	5.9	5.2
Inguinal hernia—no truss	2.2	1.4	1.4	2.2	3.1	4.8
Inguinal hernia—truss worn	2.9	0.2	1.4	2.6	5.1	8.2
Varicocele	8.1	9.9	8.5	7.8	7.8	6.9
GENITO-URINARY:						
Prostate gland—enlarged, hard, tender, or boggy	3.9	1.0	2.0	3.1	5.6	15.8
ENDOCRINE DISTURBANCES:						
Enlarged thyroid—simple goiter	2.1	3.1	3.3	1.6	1.1	0.8
MISCELLANEOUS IMPAIRMENTS:						
Headache	15.4	13.7	16.4	16.6	13.7	10.0
Use of patent medicines	8.8	6.3	8.9	9.5	8.5	7.4
Use of laxatives	9.1	6.4	7.6	9.5	11.4	12.6
Frequent colds	17.7	22.9	20.8	16.4	14.2	13.6
URINARY FINDINGS:						
Normal	78.3	78.6	79.9	79.5	76.0	70.1
Albumin—slight trace	12.9	12.5	12.3	12.4	14.2	15.8
Albumin—definite trace	2.4	3.5	2.4	1.8	2 5	5.2
Albumin—marked amount	0.8	1.4	0.7	0.7	0.9	1.2
Sugar—trace	3.6	4.4	3.2	3.6	4.1	4.2
Sugar—marked amount (quantitative)	0.5	0.1	0.3	0.3	1.0	1.1
Casts—granular or epithelial	0.4	0.3	...	0.5	0.7	0.8
Casts—hyaline	4.1	4.2	3.0	4.0	5.3	7.5

Industrial Health Service

Following is an analysis of the impairments found in representative groups of some 10,000 supposedly well people, in more than one hundred plants, where examinations were made for the purpose of detecting physical impairments and offering counsel as to their correction:

Analysis of Typical Industrial Groups

(Figures derived from more than 10,000 cases. Males—average age 34)

Class.	Per cent.
1. No physical defects or errors in hygiene	0
2. Very minor defects requiring attention or observation	10
3. Minor defects requiring hygienic correction, or minor medical, surgical, or dental attention	41
4. Moderate defects requiring medical supervision as well as hygienic correction. Impairment influencing longevity	35
5. Advanced physical impairments requiring systematic medical or surgical attention	9
6. Serious physical condition requiring immediate medical or surgical attention	5

Of those with serious impairments in this group the following percentages were noted:

	Per cent.
Moderate heart defects	15
Urinary changes with important impairments	33
Moderate arterial thickening	25
Fluctuations of blood-pressure	23
Marked infection of teeth and gums	14
Doubtful lung signs	9

Uncorrected faulty vision was present in 53 per cent. of the group; faulty posture in 44 per cent.; flat-foot and other foot defects in 21 per cent.

The accompanying table is of interest as showing the high ratio of impairments found in an average group of supposedly healthy people. Following the examination of the preliminary group of postoffice employees by the Life Extension Institute, the United States Public Health Service conducted examinations of a much larger group with the results indicated in the table.

COMPARISON OF THE RESULTS OF THE PHYSICAL EXAMINATION OF—

985 Postoffice employees examined by the United States Public Health Service.

100 Postoffice employees examined by the Life Extension Institute

Class.	Ratio in Each Class: United States Public Health Service—Postoffice Employees.	Life Extension Institute—Postoffice Employees.
1. No physical defects or errors in hygiene	0.5	0
2. Very minor defects requiring attention or observation	1.2	0
3. Minor defects requiring hygienic correction, or minor medical, surgical, or dental attention	26.2	14
4. Moderate defects requiring medical supervision as well as hygienic correction. Impairment influencing longevity	34.1	31
5. Advanced physical impairments requiring systematic medical or surgical attention	23.8	43
6. Serious physical condition requiring immediate medical or surgical attention	14.2	12

It will be noted that the United States Public Health Service and the Life Extension Institute, working on similar groups of people, are pretty close together in their findings. The variation in the more serious types of impairments was caused, doubtless, by the difference in classification rather than in the findings. Before the United States Public Health Service undertook this work it secured the Institute's system of classification, medical forms, and instructions to examiners, and an effort was made to conduct the work exactly along the same lines and in the same spirit as at the Life Extension Institute.

SPECIMEN FORMS

Because of numerous requests received from physicians and medical centers for copies of forms used in the periodic health examination service, the personal history, examination, and laboratory blanks of the Life Extension Institute are herewith reproduced.

(For the Standard Personal History and Medical Examination forms, see Section 1, Figs. 1–3.)

Detailed Record of Physical Findings

NAME

1. OCCUPATION

2. FAMILY HISTORY

On this sheet is a complete record of the findings of the physical examination. The important items are listed and commented upon in the letter to your physician which accompanies it.

3. PERSONAL HISTORY

4. EYES

Right Left Corrected to

Eye Grounds Astigmatism Color Vision

Disease of eyes or eyelids

5. EARS

Right Left

Canal and Drum

6. NOSE AND THROAT

7. MOUTH, TEETH AND GUMS

8. PHYSIQUE

Height (net) Ft. In. Chest at rest In. Abdomen In.

Present weight Lbs. (net) Posture

" " Lbs. (coat and vest, or dress off) Musculature

Skeleton and Extremities

9. CIRCULATION

Pulse per min. Character Hemoglobin % gms.

" " " (2 min. after exercise) Body Temperature °

Blood Pressure: Systolic Diastolic

" " " "

(2 min. after exercise)

Blood Vessels: Radials (at wrist); Brachials (at elbow); Retinals (internal eye); Temporals; Other

Heart

Age	Systolic: Women, mm.	Men, mm.
20	116	120
30	119	122
40	124	125
50	130	129
60	134	134
All ages	121	124

In health the blood-pressure may vary temporarily 15 mm. above or below the average. Wide variations sometimes occur from slight nervous troubles. Pressures persistently above or below the average, however, should be carefully studied and followed up.

Blood-pressure of women is distinctly lower than that of men at the earlier ages. There are only slight differences at later ages.

Pulse pressure is the difference between systolic and diastolic and ranges normally from 30 to 55 mm.

Fig. 43.—Detailed record of physical findings.

10. LUNGS

11. ABDOMINAL ORGANS

12. BRAIN AND NERVOUS SYSTEM

13. SKIN, LYMPHATICS, AND VEINS

14. ENDOCRINE GLANDS

15. GENITO URINARY

16. URINARY REPORT

PHYSICAL CHARACTERISTICS		MICROSCOPIC EXAMINATION *Centrifugalized Specimen*
Specific Gravity		Casts
Transparency		Hyaline
Color		Granular
Odor		Epithelial
Reaction		Epithelial Cells
		Leucocytes (white blood cells)
CHEMICAL REACTION		Pus
Albumin		Crystals
		Erythrocytes
Sugar	Bile	Mucus
Acetone		Cylindroids
Diacetic Acid		Amorphous

Fig. 43.—*Concluded.*

MIDYEAR CHECK-UP

Comparative Personal History Statement

COVERING THE PERIOD SINCE THE LAST HEALTH SURVEY

Name .....

Address .....

(Is above correct? .....)

IMPORTANT!

Present Weight..... (Without coat and vest, or dress) Height..... (With shoes off) Blood Pressure..... (If known)

QUESTIONS	ANSWERS
1 What illness have you had since your last examination by the Life Extension Institute?	1
2 Which items of advice given in your report with regard to dental, medical or surgical attention have you acted upon? Please give particulars and results.	2 (Use other side also)
3 Any recent deaths in family? If so, please state cause.	3
4 Any severe, unusual physical or mental strain?	4
5 *a* Present occupation?	5 *a*
b Number of hours of work daily.	*b*
6 What is your practice at present in the use of →	6 *a* TOBACCO — Number Daily: Cigars; Cigarettes; Pipefuls; Chewing Tobacco. *b* ALCOHOL — Amount Daily: Beer; Wine; Whiskey; Cocktails.
c Do you inhale when smoking?	*c*
7 *a* Do you exercise out of doors every day? What form of exercise?	7 *a*
b Do you take setting-up exercises on rising and retiring as prescribed in your report?	*b*
8 *a* Are you constipated?	8 *a*
b How often do your bowels move each day?	*b*
c Do you use laxatives or enemas frequently?	*c*
d Do you suffer from indigestion? If so, how soon after meals, and in what way?	*d*
9 *a* How many hours of sleep do you get?	9 *a*
b Do you have any recreation other than exercise?	*b*
c Have you made any changes in diet?	*c*
10 *a* Have you had any urinalyses EXCEPT at the Institute?	10 *a* Pus..... Uric Acid.....
b Have you noticed these findings in those analyses? →	*b* Albumin..... Sugar..... Casts..... High or Low sp. gr.....
11 Are you aware of any improvement that has taken place since your previous examination by the Institute?	11 (Use other side also)

12 Outline your present diet on chart below and state whether you eat in quantity sparingly (S), moderately (M), or freely (F) of the following:—

MEAT	BREAD	VEGETABLES	FOWL	SWEETS	FRUIT	TEA	COFFEE	MILK	WATER	PEPPER SPICES
						Cups daily	Cups daily	Glasses daily	Glasses daily	
CEREALS	CHEESE	FISH	PASTRY	POTATOES	EGGS	SALT	BUTTER	CREAM	Raw Vegetable or Salads	NUTS

(OVER)

Fig. 44.—Midyear check-up—comparative personal history form.

ADDITIONAL REMARKS:

(*This space is provided for Summary and Miscellaneous Comment.*)

Date..... Signed.....

Address to which reports are to be mailed.....

Fig. 44.—*Concluded.*

Children's Personal History Form

Personal History Statement by Parent

Child's full name _____ Sex _____ Age _____
Mother's full name _____ Address _____
Father's full name _____ Occupation _____
Date of birth _____ Place of birth _____ Is birth registered? _____

Family History

	Nationality (Descent)	Age	If Living Condition of Health	If Dead Cause of Death	Age at Death	Previous Health
Father						
Mother						
Sisters						
Brothers						

Has father or mother ever had tuberculosis, syphilis, mental trouble? _____
Has mother had miscarriages? _____ Cause Known? _____
No. (in order of birth) of child to be examined _____
Was mother's health during pregnancy of this child good, fair or poor? _____
If poor, describe _____
Normal or instrumental delivery? _____ Easy or difficult labor? _____

Child's Early History

Born at full term? _____ First tooth at (_____) months _____
Weight at birth? _____ Walked at (_____) months _____
Condition at birth, strong? _____ Spoke at (_____) months _____
Were any defects of development noticeable in first year? _____ State fully _____

Feeding

Breast fed or bottle fed first year? _____ to (_____) month
If bottle fed give name of commercial food or nature of formula _____
Were fruit juices, cereals or other foods also given? _____ When? _____
Is appetite now good, fair, poor? _____ Does he pick or eat everything set before him?
Does he chew his food well? _____ Does he eat quickly or slowly? _____
What vegetables does he like? _____
What meat does he eat? _____
Does he eat cereal every day? _____ Fruit or fruit juice every day? _____
How many glasses of milk does he drink daily? _____ At meals? _____
How many glasses of water does he drink daily? _____ Any between meals? _____
Does he ever have tea or coffee? _____ Does he get much candy? _____
Give one day's menu in detail with time of meals:
Breakfast _____ A. M. _____
Dinner _____ M. _____
Supper _____ P. M. _____
What does he eat between meals? _____

Sleep

Alone? _____ With whom? _____ Quietly? _____
No. of hours at night _____ Outdoors? _____ With windows open? _____
Does he have a nap? _____ How long? _____ In or outdoors? _____
Nightmares? _____ Noticeable mouth breathing? _____

Fig. 45.—Children's personal history form.

Habits, Play, Disposition

How often do his bowels move?_____ Character and color of stools_____
How often are laxatives given?_____ What kind?_____
No. of times urine is voided each day?_____ Ever at night?_____
At what age did habitual bed-wetting stop?_____
Did he suck his thumb?_____ To what age?_____
Does he bite his finger nails?_____ Does he cry easily?_____
Temper or easily hurt?_____ Is he fretful?_____
Is he obedient, impatient, or stubborn?_____
Has he abundant energy or does he tire easily?_____
Is he restless or nervous in other ways?_____
How many hours a day does he play outdoors?_____
Favorite games or occupation indoors?_____
Do his disposition, interests, or manner seem different from those of other children of his age?_____
If so, in what way?_____
Does he attend school?_____ Kindergarten?_____ Grade?_____ Public?_____ Private?_____
At what age did he begin?_____ Has he ever failed a grade?_____
Does he have difficulty with school work?_____ Is present rank good, fair or poor?_____

Sickness

Put a ring around each sickness child has had. Describe in space below. Rickets, convulsions, swollen glands in neck, ear ache, discharge from ear, skin trouble, indigestion, diarrhea, whooping cough, chicken-pox, bronchitis, pneumonia, tonsillitis, scarlet fever, diphtheria, mumps, growing pains or rheumatism, meningitis, St. Vitus dance, infantile paralysis.

Name of Disease	Number of Attacks	Date	Duration	Severity	After-Effects

Any operations?_____
Any other diseases or accidents?_____

Does he have frequent colds?_____ Does he recover readily from colds or other acute illnesses?_____
Is there anything that troubles you about the child that the above information does not cover? If so, please state fully below.

Fig. 45.—*Concluded.*

Children's Medical Examination Form

Boys and Girls

USE + SIGNS TO INDICATE DEGREE 0 NORMAL + IMPAIRMENT PRESENT ++ TREATMENT NEEDED +++ TREATMENT URGENT

1.

Name ..... Address .....

White–Colored Age yrs. mos.

Reasons for coming to the Institute

General physical? If other, give particulars.

Examination of Children Under Five to Begin with Section 5 (Eyes, Ears, Nose and Throat to be Done Later)

2.

Distant Vision Rt. / Lt. / Glasses worn { yes / or / no } Corrected to { Rt. / Lt. } Pupils { Inequality / Irregularity }

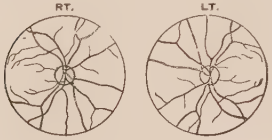
Near Vision Rt. J Lt. J Glasses worn { yes / or / no } Corrected to { Rt. / Lt. } Reaction { Light / Accommodation }

Fields for form / " " color Glasses or further Correction needed { yes / or / no } Nystagmus

Astigmatism Yes or No. Glasses worn { yes / or / no }

Muscle Balance

RT. LT.



Color vision—
Conjunctiva—
Media—
Other Defects—
History—
Eye Strain—
Close Work—

3.

Hearing { Rt. /10 / Lt. /10 } Canal { Rt. / Lt. } Drum { Rt. / Lt. } Rinne { Rt. / Lt. } Weber Lateralized { Rt. / Lt. }

History

4.

Nasal Septum
Turbinates
Sinuses Antra
Adenoids
Tonsils | Enlarged | Buried | Cryptic | Septic | Exudate | Absent |
Naso-Pharynx
Oro-Pharynx
Uvula Larynx

Odor
Nasal discharge
Postnasal discharge
Character
Unilateral or bilateral
History—Discharge (type)
Frequent colds
Hay fever—Asthma

5. General Appearance: Good—Fair—Poor. Nutrition: Good—Fair—Poor—Overweight—Underweight.

Expression: Bright—Tired—Apathetic—Anxious. Temperature (Rectal-Mouth) ..... Hemoglobin ..... %

6. Height ..... Inches. Weight ..... Lbs. ..... Oz. Maximum Weight ..... When .....

Rest ..... In. Abdomen (at umbilicus) ..... In. Recent gain .....

Chest: Insp. ..... In. Recent loss .....

Exp. ..... In. Reason for loss .....

MOUTH, TEETH, GUMS

7. Mouth Held Open? Lips: Normal—Pale—Fissured

Tongue: Normal ..... Coated ..... Dry ..... Protruding ..... Foul Breath?

Gums: Normal ..... Infected ..... Bleeding

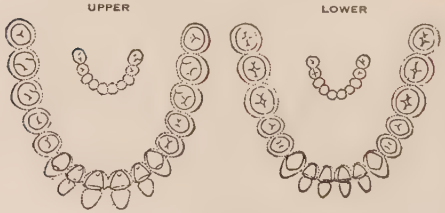
Teeth: Number 1st set ..... Number Filled ..... Special Needs

Number 2nd set ..... Number Carious .....

Malocclusion ..... Well cared for? .....

Discolored .....

UPPER LOWER



Ever x-rayed?
When, findings and action taken.

If yes, by Institute?

X-ray advised this year?
Yes No.

Fig. 46.—Children's medical examination form.

HEAD

8. Head: Normal shape—Prominent bossae—Hydrocephalic—Microcephalic—
Fontanel: Closed—Open——Finger breadths.
Any asymmetry of Head Asymmetry of Ears.

9. SKIN, SCALP, NAILS

Skin Changes Treatment Needed?
Scalp Changes Treatment Needed?
Hair: Normal—Too coarse—Too fine—Abundant—Scanty—
Nails: Normal—Chewed—Infected—Clubbing of fingers.

10. LYMPHATICS AND ENDOCRINE SYSTEM

Lymph nodes: Cervical Scars (Sinus—Operative)
Auxillary——Inguinal——Epitrochlear

Thymus Any suggestive history?
Status Lymphaticus?
Thyroid: Normal—Barely palpable—Enlarged Basal Metabolism advised?
Size (base of neck) :
if enlarged : Hyper—Hypo—Dys-function
Any evidence of other endocrine disorder?

11. BRAIN AND NERVOUS SYSTEM

Normal Mentality
Self-Control: Good—Bad
Unmanageable—Bad temper—Sullen—
Speech
Tremors—Fingers—Tongue
Coarse—Fine—Intention
Paresthesia—Anesthesia
Special Notes

Knee jerks: Present—increased—
sluggish—absent—apparently pathological?
Ankle Clonus
Babinski
Nuchal rigidity
Kernig's sign
Romberg
Incoordination
Choreiform movements
Tics.
Gait—Normal—Shuffling—Spastic—Waddling.

12. POSTURE, TRUNK, SPINE, EXTREMITIES

Posture: Erect—Drooping—Round Shoulders—Uneven Shoulders—Other defects.

Muscle tone: Firm—Flabby—Any evident paralyses—Atrophy

Spine: Normal—Flexible—Rigid areas—Tenderness

Curvature: Lateral—Lordosis—Rotation
Kyphosis: Angular—Gradual

Feet: Flat foot 1st 2nd 3rd
Symptoms?
Transverse Arch
Ant. Post. Arch
Callous
Hammer toes
Over-riding toes
Contracted toes
Toeing out
Pronation
Hallux Valgus
Shoes

Chest:
Normal
Pigeon
Funnel
Barrel
Other defect
Beaded Ribs (rosary)
Rachitic groove

Epiphyseal enlargement
Bow legged
Knock Kneed
Saber-shin
Edema
Evidence of hip-disease. Bone sinuses
Joints: Swollen — Crepitant
Ankylosed—Partially ankylosed

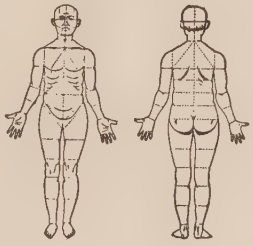


Fig. 46.—*Continued.*

13. PULSE

Rate Sitting

Large-Small-Strong-Weak

Regular Irregular (Sinus arrythmia. Extrasystole)

Rate immediately after exercise

Rate 2 minutes after exercise

BLOOD PRESSURE

Systolic Diastolic

(2 minutes after exercise)

Systolic Diastolic

ARTERIES calibre Thickening Radials Brachials Temporals Others

---

14. THORAX

Apex Beat: Heart and Lungs

In th Interspace——in. from mid-sternal line. At—Within—Outside—Mid-clavicular line.

Palpable—Visible—Heaving—Thrill.

Enlargement: No—slight—marked.

Heart Sounds: Clear—dull—loud—rough—overactive.

Rythm: Regular—Irregular—Auric. Fibrillation—Extrasystoles—Heart Block—Pulse deficit—Other irregularity.

Murmurs:

Quality——————

Best Heard——————

Systolic—Diastolic—Presystolic.

Transmitted——————

Apparently-functional?—Organic?

Effect on murmurs of

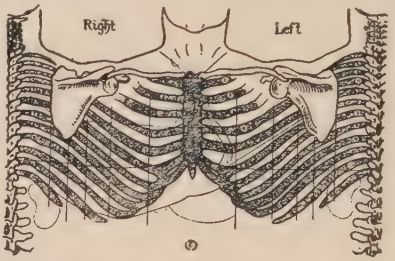
Lying down

Exercise

Held respiration

Pulmonic 2nd Aortic 2nd

(Indicate accentuation by + or ++)



Inspection: Excursion, fixation, restriction, asymmetry, respiratory rate.

Palpation——————

Percussion——————

Auscultation——————

Rales / Type ——————when heard { Beginning respiration—— / End respiration—— / After coughing——

History of Cough—hemoptysis—fever—night sweats—loss of weight—prolonged illness—pleurisy—asthma—bronchitis—sputum test.

---

15. ABDOMEN

Shape: Normal—Pot-belly—Distended—Overly tympanitic.

Areas of Tenderness——————

" of Rigidity——————

Liver: Not felt—Felt——fingers.

Spleen: Not felt—Felt——

Other masses. Describe——————

Hernia:

History: Appetite——

Constipation——

Diarrhea——

Recurrent——

Bloody stools——

Parasites——

Jaundice——

Pain:

Location——

Radiation——

Relation to Meals——

Nausea and vomiting——

Cyclic vomiting——

INGUINAL

16. External rings Hernia Type Truss worn? Well fitting?

Right Right " advised?

Left Left Operation advised?

Femoral Hernia

Fig. 46.—*Continued.*

17. **GENITO-URINARY AND VENEREAL HISTORY**

Hematuria Pyelitis Cystitis
Frequent, difficult or painful urination Nocturia
Any evidence of congenital syphilis?
Wassermanns When Result
Gonorrhea date Treated
Syphilis date Treated

18. **GENITO-URINARY—Male**

Pre-adolescent
Penis—urethra
Circumcised Needed
Adherent Prepuce
Inflammation
Testicles Varicocele
Normal Hydrocele
Undescended
Atrophic Known cause?

Post-adolescent (Additional)
Prostate
Enlarged
Symmetrical
Irregular
Hard
Tender
Boggy

Any evidence or history of masturbation

Secondary Sex-characters.
Beard
Voice
Genital development.

19. **RECTUM**

Rectum · Normal—Fissures—Fistula—Prolapse

Hemorrhoids: External—Internal—Bleeding—Pruritis

18. **GENITO-URINARY—Female**

Pre-adolescent
Congenital defects
Vaginitis
Actual Discharge
Character
Other inflammation
Hymen: Normal—Intact
Abnormality
Any evidence or history of masturbation

Post-adolescent (additional)
Onset of menses. Age
Character of flow
Moderate—Scanty—Profuse
Regular?
Interval Duration
Pain—When menses first began?
At present?
Where?
Rectal exam. if History Abnormal.

Uterus: Size
Position
Mobility
Appendages
Masses
Tenderness

Secondary Sex-characters
Mammary development
Hair · Axillary Pubic
Vulvar development

20. **SUMMARY**

General Condition (Vitality?) Excellent Good Fair Poor Feeble

List below the important physical findings and errors in hygiene that should be considered or discussed in the final report to the parent or guardian.

PHYSICAL FINDINGS	HYGIENE CORRECTIONS
1.	
2.	
3.	
4.	
5.	

List below investigations necessary. Why?	List conditions needing medical supervision.
1.	1.
2.	2.
3.	3.
4.	4.

Examined by

Date

Fig. 46.—*Concluded.*

CHILDREN'S COMPARATIVE PERSONAL HISTORY STATEMENT

Comparative personal history statement, covering the period since the last health survey.

Mrs._____ for _____

Answers to be given preferably by mother.

(Is above correct?____)

IMPORTANT

Present weight_____ Height_____
(Cross out words not applying) Clothes off or on? Shoes off or on?

QUESTIONS	ANSWERS
1. Has child been ill since examination by Institute? If so, kindly give particulars. Has the attendance of a physician been necessary?	
2. If medical or surgical attention was advised in the report, we would like to know what has been done to carry out the recommendations. Please report fully (use other side if necessary).	

3. Have any teeth been extracted? ..... If so, which ones?_____
Have any new teeth appeared?_____ If so, which ones?_____
Have the teeth been inspected by dentist and necessary cleaning and repairs done?_____
Are the teeth brushed thoroughly night and morning?_____

4. How often each day do the bowels move? ..... Are the stools hard or soft?_____
Are laxatives or enemas used frequently? ..... If laxatives, what kind?_____

5. Usual time of going to bed at night?_____ Usual time of rising in the morning?_____
Is play or exercise out of doors obtained every day?_____ For how long?_____
What are the favorite games or forms of exercise?_____
Other interests or recreation besides play?_____

6. What is the grade in school?_____ Has a change of school been made?_____
Is school work done easily or with difficulty?_____

7. What changes have been made in diet selection or habits of life?_____

8. Has child's progress and development in the last 6 months seemed normal and satisfactory to you?_____
If not, explain_____
Has any improvement over former conditions been noticeable?_____

(Kindly use other side for additional information or questions to us)

9. Has there been any recent death among parents, brothers or sisters?_____
If so, please state cause_____

10. Outline present diet on chart below. State whether each article is eaten sparingly (use S), moderately (use M), or freely (use F).

MEAT	BREAD	VEGETABLES	FOWL	SWEETS	FRUIT	PEPPER SPICES	TEA Cups daily	COFFEE Cups daily	MILK Cups daily	WATER Glasses daily
CEREALS	CHEESE	FISH	PASTRY	POTATOES	EGGS	SALT	BUTTER	CREAM	RAW VEGETABLE SALAD	NUTS

(OVER)

Fig. 47.—Children's comparative personal history form.

(*This space is provided for Summary and Miscellaneous Comment.*)

Fig. 47.—*Concluded.*

School Group Personal History Form

To be filled out preferably by parent or teacher, with help of pupil.

Name _____ Sex _____ Age _____ Yrs. _____ Mos. School _____

Father or Mother's name _____ Home Address _____

If father is living, is he well? _____ If not living, cause of death _____

If mother is living, is she well? _____ If not living, cause of death _____

Are there brothers or sisters not living? _____

If pupil has had any of the following, put "yes" or "no" by name of disease, or dates if known.

Whooping cough _____	Measles _____	Tonsillitis _____	Convulsions _____
Mumps _____	Scarlet fever _____	Rheumatism _____	Skin trouble _____
Chicken pox _____	Diphtheria _____	Pneumonia _____	Infantile paralysis _____

Other severe illness or operation? _____

Except for these illnesses, has attendance at school been regular? _____

If not, explain _____

Does the pupil have frequent colds or sore throats? _____ Is recovery quick? _____

Do the **bowels** move every day? _____ At what time or times? _____

In space under name of food put letters as follows: F, for more than one portion daily; D for one portion daily; M for 3 or 4 a week; S for occasional.

Cooked Cereal	Fruit Cooked Raw or Juice	Eggs	Meat Fish Fowl	Potato or Rice	Other Cooked Vegetables	Raw Vegetables	Dessert	Pastry

What other foods are eaten by this pupil? _____

Are bread and butter eaten freely? _____

How many glasses each day of

Water	Milk	Cocoa	Tea	Coffee
Glasses	Glasses	Cups	Cups	Cups

Has the pupil the habit of **eating** rapidly? _____ Is appetite good–fair–poor?

Is **candy** eaten between meals? _____ (For **boys**) Does he smoke? _____

Are sandwiches, sodas or ice cream eaten **between** meals? _____

Do bowels move freely or with difficulty? _____

How long is the **rest** period every day? _____

How many hours of **sleep** each night? _____ Retires _____ p. m., rises _____ a. m.

How many hours spent **outdoors**? _____ Walking _____ Kind and amount of other exercise _____

How much exercise **indoors**? _____ Kind? _____

Number of hours each day spent in **class room**? _____ in **study** outside class room? _____

Ring **activity** or **interest** outside course of study: Music–dancing–dramatics–debating–social functions–hand craft–competitive sports–(Name favorite game or sport) _____

How much **time** each week given to them? _____

Is pupil's reaction normal to interests of his or her age? _____

Is the attitude and spirit agreeable and contented? _____

If not, state the cause if known _____

State any other fact which should be considered in this report _____

Fig. 48.—School group personal history form.

School Group Medical Examination Form

Report of physical examination of _____ of _____

In this report O means normal; + slight impairment; ++ definite impairment; +++ marked impairment.

1. Appearance-Nutrition — Good Fair Poor — Age ____ yrs. ____ mos. — Frame — Hemoglobin — Temperature

2. Physique — Height ____ in. (Shoes off) — Weight ____ lbs Net — Recent loss ____ lbs. Recent gain ____ lbs. — Chest at rest ____ in. Expansion ____ in. Girth at umbilicus ____ in.

3. Eyes — Distant Vision Rt. ____ / Lft. ____ / — Near Vision Rt. ____ Lft. ____ — Glasses needed? Glasses worn? Fully corrective? — Astigmatism? Eye disease? — Reflexes

4. Ears — Hearing Rt. ____ /10 Lft. ____ /10 — Canal — Drum — History of discharge

5. Nose — Breathing
Sinuses (Antra)
Throat — Report (if abnormal) on septum, turbinates, adenoids, tonsils—buried, enlarged, cryptic, septic, out.

6. Mouth, Teeth, Gums, Tongue — Note number of carious teeth, malocclusion, etc. — Tongue—coated—clean — Lips—pale—good color

7. Pulse — Before exercise: Rate ____ Character ____ — Sitting — 2 minutes after exercise: Rate ____ Character ____ — Nervous?

8. Blood-pressure — Before exercise: Systolic ____ Diastolic ____ — 2-3 Minutes after exercise: Systolic ____ Diastolic ____
Blood Vessels — Radials / Brachials / Others

9. Heart — Note change in size, position. — Murmurs? — Transmitted? — Apex: In ____ intercostal space; In ____ inches from mid-sternal line

10. Lungs — Note chest deformity or evidence of rickets if present

11. Stomach and Abdominal Organs — Note ptosis — Rectum — Hernia

12. Inguinal Region — Adolescent — Male—Circumcised? Any irritation? Genitals—normal—retarded—advanced

13. Kidneys, Bladder and Sex Organs — Female—Menstrual History Genitals—normal—retarded—advanced

14. Brain and Nervous System — Note gait, co-ordination, response, attitude, speech

15. Posture and Spine — Good—Fair—Poor — Note curvature — Muscles: Firm / Flabby

16. Extremities — Upper — Lower — Feet — Shoes

17. Endocrine Glands — Note evidence of change in function

18. Lymphatic System — Note cervicals, epitrochlears, inguinals — Scars.

19. Skin and Scalp — Has Schick test been taken? Has toxin-anti-toxin been given? — Inoculated, Typhoid? Vaccinated, Smallpox? or bad disease

20. Important physical findings and attention recommended.

URINARY ANALYSIS — Spec. Gravity ____ Reaction ____ Albumin ____ Sugar ____ Other Findings ____

Rating ____ %

Signed ____ M. D. Date ____ 192__

Fig. 49.—School group medical examination form.

INSURANCE HEALTH SERVICE—PERSONAL HISTORY FORM

ALL RECORDS CONFIDENTIAL

Person to be examined to fill out this side of blank before examination. Physician to fill out reverse side.

AGE / BIRTH / PLACE	MARRIED / SINGLE / WIDOWED	OCCUPATION	PARTICULAR KIND OF WORK	PREVIOUS OCCUPATION

Family Record	Age if Living	Health (Good or Bad) If not good, give full details	Age at Death	Cause of Death
Father				
Mother				

	Age	Health	Age at Death	Cause
Brothers				
Sisters				

1. State whether you eat SPARINGLY (S), MODERATELY (M) or FREELY (F), of the following foodstuffs:

MEAT	BREAD	VEGETABLES	FOWL	SWEETS	FRUIT	FRESH MILK		PEPPER SPICES, ETC.	CEREALS
CHEESE	FISH	PASTRY	POTATOES	EGGS	SALT	BUTTER	CREAM	SOUR MILK OR BUTTER MILK	RAW VEGETABLES SALADS, ETC.

2. A. Number of HEARTY MEALS daily (state which) — A
   B. Do you eat RAPIDLY, SLOWLY or in an INTERMEDIATE way? — B
   C. How often do you eat MEAT? — C
3. *a* How many glasses of WATER do you drink daily? — 3. *a*
   b How many of these at meals? — *b*
4. How many cups do you drink daily of—

TEA	COFFEE	MILK	CHOCOLATE	COCOA
cups daily	*cups daily*	*cups daily*	*cups daily*	*cups daily*

5. What is your practice in the use of ALCOHOL? (State how much DAILY; in what quantity, and the form.)

BEER	WHISKEY	WINE	OTHER ALCOHOLIC BEVERAGES
daily	*daily*	*daily*	*daily*

6. What has been your PAST HABIT in the use of alcohol? — 6.
7. What is your practice in the use of TOBACCO? (State how much DAILY and the form.)

CIGARS	CIGARETTES	PIPEFULS	CHEWING TOBACCO
daily	*daily*	*daily*	*oz. daily*

8. Do you SLEEP well? How many hours? — 8.
9. Do you sleep in a WELL-VENTILATED bedroom with windows open? — 9.
10. How many HOURS do you WORK each day? — 10.
11. Do you follow any special PURSUIT or RECREATION aside from business? — 11.
12. How much time do you give to OUTDOOR EXERCISE? What form? — 12.
13. How much time do you give to INDOOR EXERCISE? What form? — 13.
14. State BATHING habits. — 14. WARM BATHS—how frequently? COLD BATHS—how frequently?
15. Are you WORRIED or APPREHENSIVE about your health? Why? — 15.
16. Are glasses used? Were they prescribed by a PHYSICIAN, OCULIST, OPTOMETRIST, OPTICIAN? — 16.
17. Do you suffer from HEADACHES? If so, how often and how severely? — 17. SEVERE? MILD? FREQUENT? INFREQUENT?
18. Do you often take headache POWDERS or PATENT MEDICINES for any condition? — 18.
19. *a* Are you CONSTIPATED? — 19. *a*
    b How often do the bowels move FREELY? — *b*
    c Do you use LAXATIVES or ENEMAS frequently? — *c*
20. *a* Did you suffer from any severe ILLNESS or INJURY in childhood? — 20. *a*
    b If so, has it affected your present health? — *b*
21. *a* DO YOU NOW SUFFER OR HAVE YOU EVER SUFFERED FROM THE FOLLOWING TROUBLES?

If you write "Yes," please also give full information on lines below (21a)

Vertigo or Dizziness	*Blood Spitting (lungs)*	*Discharge from Ear*
Rheumatism of Joints	*Shortness of Breath*	*Pain in the Region of the Heart*
Other forms of so-called Rheumatism	*Vomiting of Blood*	*Frequent coughs or colds*
Gout	*Chronic skin disease*	*Acid Dyspepsia (sour stomach)*
Severe Abdominal Colic	*Rupture*	*Other stomach or bowel trouble*
Syphilis		
Gonorrhea		
Frequent urination		
Difficult urination		
Other serious disease or injury		

21. *b*

NAME OF DISEASE	NUMBER OF ATTACKS	DATE	DURATION	SEVERITY	RESULTS

22. Is your health now in any way affected? If so, state particulars. — 22.
23. State any other matter on which we should be informed, or any question you may wish to ask regarding your health. — 23.
24. *a* Have you a FAMILY PHYSICIAN? — 24. *a*
    b How long since you consulted him? — *b*

FOR THOSE WHO HAVE PREVIOUSLY BEEN EXAMINED BY THE INSTITUTE

25. Have you endeavored (by medical treatment or advice, correction of faulty living habits, etc.) to better your health since your last examination by the INSTITUTE? (Please give full details.) — 25.
26. Are you aware of any improvement since then? (Answer as fully as possible.) — 26.

Give address to which all reports are to be mailed _____

Date _____ Signed _____

Hand this blank at the time of the examination, to the examining physician who will forward it to this office with his report.

Fig. 50.—Insurance health service—personal history form.

INSURANCE HEALTH SERVICE—MEDICAL EXAMINATION FORM

Person to be examined should fill out the reverse of this blank and then make an appointment with

DR._____

The body can not be given a scientific examination through the clothing. Please request necessary diarobing.

Use + sign to indicate degree. (O Normal) (+ Impairment present) ++ Treatment needed +++ Treatment urgent

Medical Report on_____ of_____

1. Appearance and Nutrition
Color of Hair_____ Eyes_____
Age_____ yrs. Race_____
Good-Fair-Poor Note pallor, anemia, cyanosis, debility, depression, obesity, emaciation.
Small boned / Medium / Large } for height.
Temperature °

2. Physique
Height ft. in. (Shoes off)
Weight lbs. Recent gain lbs. Recent loss lbs. (Coat and vest, or dress, off)
Cause?
Chest at rest in.
Girth at umbilicus in.

3. Eyes
Distant Vision Rt. / Lft. /
Near Vision Rt. J. Lft. J.
Glasses needed?
Glasses worn? If yes, do they give Full correction?
Astigmatism?
Eye disease?
Pupils Unequal? Irregular? Sluggish?

4. Ears.
Whispered voice at 10 ft. or conversational voice at 20 ft. (back turned)
Hearing Rt. /10 Lft. /10
Inspection { Canal / Drum

5. Nose and Throat
Deflected Septum
Enlarged turbinates
Tonsils—buried, enlarged, cryptic, septic, out.
Use + signs over word applying to indicate degree.

6. Mouth, Teeth, Gums
Infected gums, number of crowns, caps, pivot, pulpless, carious teeth. Many filled teeth? (coated or edematous tongue)

7. Pulse
Before exercise / If over-rapid retake / 2-3 minutes after exercise.
Rate (Sitting) Character Rate Character
Irregularity, intermittance, slows, arhythmia, increased by exercise)
Nervous?

8. Blood Vessels
Radials
Brachials
Others
Tension is not thickening. Search for THICKENING by deep firm pressure, regardless of age or blood pressure.

9. Blood Pressure
Before exercise / 2-3 minute after exercise. (Doubtful cases)
Systolic Diastolic Systolic Diastolic
If set within normal limits retake and exclude nervousness.
Instrument

10. Heart
Apex { In _____ Intercostal space / _____ inches from mid-sternal line
Sounds, size, action, location of murmurs Transmitted? Where?

11. Lungs
Area of dullness. Location of rales. Kind. When heard? Other signs?

12. Stomach Abdomen
Rectum Hemorrhoids { Internal / External / Bleeding
Distention, displacement, enlargement, painful areas, etc. (liver, spleen, kidney, gall bladder, duodenum, appendix, umbilical hernia)

13. Inguinal Region
Varicocele? { Support worn / needed?
Hydrocele?
Look carefully for and describe rupture. If so, is truss worn?

14. Genito-urinary & Venereal
Prostate { Enlarged? / Tender? / Hard? / Boggy?
History or present evidence of and details of treatment. Stricture?

15. Brain and Nervous System
Mental state
Neurasthenia
Psychasthenia
Phobias
Knee Reflexes { Unequal / Exaggerated / Sluggish / Absent
Romberg
Tremors
Incoordination
Gait, speech

16. Posture
Good-fair-poor
Special defects of posture
Musculature { Flabby? / Moderate? / Firm?

17. Spine
Note location and degree of any curvature. Lateral or antero-posterior? Rotation? Points of tenderness

18. Extremities
Upper Lower
Note deformities, amputations, painful, enlarged or deformed joints, varicose veins (extent, ulceration?) Is stocking worn?

19. Feet
Shoes and stockings off
Note degree of depression, longitudinal or transverse arch; weak foot, toeing out or in, faulty shoes. Any symptoms, pain in limbs, corns, bunions, etc.

20. Endocrine Glands
Note enlargement of thyroid, symptoms, exophthalmos, or circulatory disturbance. Hypothyroidism? Hyperthyroidism?

21. Lymphatic System
Note enlarged lymph nodes, region, extent and possible source of infection, specific?.

22. Skin
Inoculated, Typhoid? Vaccinated, Smallpox? or had disease
Condition, dryness, clamminess, eruptions, scars.

23. Questions to women
Children Living Dead Miscarriages Cause?
Menstrual disturbance
Pelvic or mammary disease, past or present

K. W.
What is examinee's chief complaint?
What is the probable explanation of it?
What are the important features revealed by the examination?
1. 3.
2. 4.
What x-ray or laboratory investigation do you recommend?

D. **E.**
For what do you consider medical treatment or supervision necessary?

Date_____ 192 Signed_____ M. D.
Form 510 Listed Dictated

Fig. 51.—Insurance health service—medical examination form.

INDUSTRIAL HEALTH SERVICE—PERSONAL HISTORY FORM

Employee will fill out and sign this side of blank and hand it to physician at time of examination.

AGE	MARRIED / SINGLE / WIDOWED	OCCUPATION	INDUSTRY	PARTICULAR KIND OF WORK	PREVIOUS OCCUPATION
years					

Family Record	Age if Living	Health (Good or Bad) If not good, give full details	Age at Death	Cause of Death
Father				
Mother				
Brothers				
Sisters				

Age	Health	Age at Death	Cause

1. State whether you eat SPARINGLY (S), MODERATELY (M) OR FREELY (F), of the following foodstuffs:

MEAT	BREAD	VEGETABLES	FOWL	SWEETS	FRUIT	BUTTER	PEPPER SPICES, ETC.	CEREALS

CHEESE	FISH	PASTRY	POTATOES	EGGS	SALT	CREAM	RAW VEGETABLES, SALADS, ETC.

2 *a.* Are you a HEARTY, MODERATE OR LIGHT eater?
b. Do you eat RAPIDLY, SLOWLY OR IN AN INTERMEDIATE way?

2. *a.* *b.*

3 How often do you EAT MEAT?

3.

4 How many glasses of WATER do you drink daily?

4.

5 How many cups do you drink daily of—

5.

TEA	COFFEE	MILK	CHOCOLATE	COCOA
cups daily	cups daily	cups daily	cups daily	cups daily

6 What is your practice in the use of ALCOHOL? (State how much DAILY: in what quantity, and the form.)

6.

BEER	WHISKEY	WINE	OTHER ALCOHOLIC BEVERAGES
daily	daily	daily	daily

7 What has been your PAST HABIT in the use of alcohol?

7.

8 What is your practice in the use of tobacco? (State how much DAILY and the form.)

8.

CIGARS	CIGARETTES	PIPEFULS	CHEWING TOBACCO
daily	daily	daily	oz. daily

9 Do you SLEEP well ? How many hours?

9.

10 Do you sleep in a WELL-VENTILATED bedroom with windows open?

10.

11 How many HOURS do you WORK each day?

11.

12 Do you follow any special PURSUIT OR RECREATION aside from business?

12.

13 How much time do you give to OUTDOOR EXERCISE? (What form?)

13.

14 How much time do you give to INDOOR EXERCISE? (What form?)

14

15 State BATHING habits.

15. WARM BATHS—how frequently? COLD BATHS—how frequently?

16 Are you WORRIED OR APPREHENSIVE about your health?

16.

17 Do you suffer from HEADACHES? If so, how often and how severely?

17 SEVERE? MILD? FREQUENT? INFREQUENT?

18 Do you often take headache POWDERS OR PATENT MEDICINES for any condition?

18.

19 *a* Are you CONSTIPATED?
b How often do the bowels move FREELY?
c Do you use laxatives or enemas frequently?

19 *a*
b
c

20. *a* DO YOU NOW SUFFER OR HAVE YOU EVER SUFFERED FROM THE FOLLOWING TROUBLES?
("Yes" does not give sufficient information.) Answer fully in space provided below.

Vertigo or Dizziness	*Blood Spitting (lungs)*	*Discharge from Ear*	*Syphilis*
Rheumatism of Joints	*Shortness of Breath*	*Pain in Chest or around Heart*	*Gonorrhea*
Other forms of so-called Rheumatism	*Vomiting of Blood*	*Frequent coughs or colds*	*Frequent urination*
Gout	*Chronic skin disease*	*Acid Dyspepsia (sour stomach)*	*Difficult urination*
Severe Abdominal Colic	*Rupture*	*Other stomach or bowel trouble*	*Other serious disease or injury*

20. *b*

NAME OF DISEASE	NUMBER OF ATTACKS	DATE	DURATION	SEVERITY	RESULTS

21. Is your health now in any way affected? If so, state particulars.

21.

22. State any other matter on which we should be informed, or any question you may wish to ask regarding your health.

22

FOR THOSE WHO HAVE PREVIOUSLY BEEN EXAMINED BY THE INSTITUTE

23. What improvement in health have you experienced as a result of your examination and Institute's advice? (Answer as fully as possible.)

23.

Date_____ Signed_____

Fig. 52.—Industrial health service—personal history form.

INDUSTRIAL HEALTH SERVICE—MEDICAL EXAMINATION FORM

Medical Report on.....of.....

To interpret the report consider O normal, + slight impairment, ++ definite impairment (requiring attention or treatment), +++ marked impairment, treatment urgent.

1. Appearance-Nutrition Good Fair Poor Age.....yrs. Race Hemoglobin % Frame.

2. Physique and Temperature: Temperature ° Height ft. in. (Shoes off) | Weight lbs. (Coat, vest or waist off, or not) Recent loss lbs. Recent gain lbs. | Chest at rest in. Girth at umbilicus in.

3. Eyes: Distant Vision Rt. / Lft. / Near Vision Rt. J. Lft. J. | Glasses needed? Glasses worn? Fully corrective? | Astigmatism? Eye disease? Pupils Unequal? Irregular? Sluggish?

4. Ears: Hearing Rt. /10 Lft. /10 | Drum Rt Lt | Canal Rt Lt

5. Nose
Sinuses (Antra)
Throat

6. Mouth, Teeth, Gums, Tongue

7. Pulse Rate (Before exercise, Sitting) Character | (2-3 Minutes after exercise) Rate Character

8. Blood Vessels: Radials, Brachials, Others

9. Blood-pressure (Before exercise) Systolic Diastolic | (2-3 Minutes after exercise) Systolic Diastolic

10. Heart — Apex: In.....intercostal space .....inches from mid-sternal line

11. Lungs

12. Stomach and Abdominal Organs Rectum

13. Inguinal Region

14. Kidneys, Bladder and Sex Organs Nightly urination?

15. Brain and Nervous System

16. Posture Good—Fair—Poor Spine Muscles: Firm, Moderate, Flabby

17. Extremities: Upper Lower Varicose veins

18. Endocrine Glands: Thyroid enlarged? Symptoms?

19. Lymphatic System

20. Skin Inoculated, Typhoid? Vaccinated, Smallpox? or bad disease

The enclosed leaflets are a very important part of your report and should be read carefully from time to time.

URINARY ANALYSIS: Spec. Gravity, Reaction, Albumin, Sugar, Other Findings

Rating.....% Signed.....M. D. Date.....19.....

Fig. 53.—Industrial health service—medical examination form.

REPORT FORMS COVERING SUPPLEMENTARY INVESTIGATIONS

Urinalysis Report Form

LABORATORY OF CLINICAL PATHOLOGY

CAUTION: A urine report by itself cannot give complete information as to the condition of the kidneys. Periodic examination of the urine has a high value in checking up the kidney conditions, but such reports must always be considered in relation to the general physical condition of the individual and such symptoms and history as may be reported. For example, occasionally, in fairly advanced kidney disease, the urine may be apparently perfectly normal. On the other hand temporary irritating causes may bring about an apparently serious urinary picture. Hence all such evidence should be properly followed up and where there is any reason to suspect involvement of the kidney, the urinary report alone should not be accepted if normal, but there should be further investigation by means of the following special tests: 1. A twenty-four hour urine "Concentration Test." This method of analysis is particularly valuable in cases where slight kidney impairment is suspected, and is also of great aid in connection with the other tests, in determining the probable degree of change where it is known that kidney impairment exists; 2. An examination of the blood for urea nitrogen, uric acid, creatinin,—waste products that are likely to be retained when the kidneys are not normal, also for sodium chloride; 3. A renal efficiency test, which is made by injecting coloring matter into the blood and noting the amount that is excreted by the kidney within a given time.

Fig. 54.—Urinalysis report form.

ANALYSIS OF URINE

PHYSICAL CHARACTERISTICS

Specific Gravity

Transparency

Color

Reaction

Sediment

CHEMICAL REACTIONS

Albumin

Sugar

Acetone

Diacetic Acid

Indican

Bile

MICROSCOPIC EXAMINATION

(Centrifugalized Specimen)

Casts

Hyaline

Granular

Epithelial Cells

Leucocytes

with Clumping

Crystals

Uric Acid

Sodium Urate

Calcium Oxalate

Triple Phosphate

Erythrocytes

Mucus

Cylindroids

Amorphous

REMARKS

Be sure to read the printed matter on this form, for an explanation of the terms used in the report as well as an explanation of the significance of various findings and limitations of the ordinary urinalysis.

Fig. 54.—*Continued.*

GLOSSARY OF TERMS

SPECIFIC GRAVITY.—This is the density as compared to water. In health it varies from 1010 to 1030. Temporary influences, i.e., nervousness, excess of water, tea, coffee may cause low specific gravity. Heavy perspiration, lack of sufficient water or excess of flesh food may cause high specific gravity. Ruling out these factors, persistent low specific gravity suggests kidney weakness, persistent high specific gravity may indicate diabetes or certain forms of kidney trouble.

TRANSPARENCY.—Urine in health is usually transparent but may become cloudy from mineral salts. Pus or matter in urine or decomposition may cause cloudiness. Transparent urine may be present in disease and cloudy urine in health. These conditions alone are not significant.

COLOR, ODOR.—Require no comment, vary with diet, in health. May be ammoniacal and offensive in bladder trouble.

REACTION.—This may be acid, alkaline or neutral. Urine in health is usually slightly acid. May become acid or alkaline as influenced by diet. Alkaline urine may indicate bladder trouble but not necessarily. Decomposition may cause alkaline reaction.

SEDIMENT.—In health the sediment is scanty unless due to normal salts. In health cold urine often shows copious sediment and clears on heating.

ALBUMIN.—Slight albuminuria, a trace of albumin in urine, is a symptom, like headache, fever or rapid pulse, and may be transient and of no importance. When combined with other impairments, such as constipation, anemia, obesity, infected gums or teeth, high blood pressure, etc., it emphasizes the need for attention to such troubles. But, in the absence of serious disturbance of the blood pressure or of microscopic findings of an unfavorable character, a trace of albumin by no means indicates kidney trouble.

If slight albuminuria is persistent, it usually indicates that the individual is somewhat below par; and emphasizes the need of observing the ordinary laws of personal hygiene, especially with regard to simplicity in diet, meat or flesh foods, salt and salted and highly spiced foods, tea and coffee, greatly reduced, avoidance of alcohol and tobacco, and the need for moderation in living all along the line. Cold bathing is not advisable in such cases. Violent competitive sports, and physical and mental over-exertion are also to be avoided.

Persistent albuminuria even if slight and pronounced albuminuria especially with casts or other symptoms calls for critical kidney and blood tests such as are described on the front page.

SUGAR.—Sugar in the urine may be due to errors in diet, too much starch or sugar in the diet, or to disease, diabetes. Repeated tests are necessary to determine this.

Sugar may be present in the urine persistently without true diabetes existing. Aways it is well to have a blood sugar or sugar tolerance test if sugar is persistently present. If such tests are favorable sugar in the urine is of little importance.

ACETONE OR DIACETIC ACID.—Indicates a tendency to acidosis; sometimes present in diabetes and certain kidney troubles.

INDICAN.—Often present in cases of bowel sluggishness or excess of flesh food. Reflects decomposition of such foods in intestines and absorption. May be a cause of kidney irritation if persistent.

Fig. 54.—*Continued.*

BILE.—Present in cases of faulty liver action or gall bladder disease.

CASTS.—These are microscopic bodies formed by accumulation of material in the tubes of the kidneys. Hyaline casts may be present in very small numbers in practically normal urine; but even in small numbers they may indicate kidney impairment if combined with other signs such as high blood pressure, low specific gravity of urine and symptoms of ill health.

Granular, epithelial or other casts are more significant of kidney inflammation and irritation as they are formed of material from the structure of the kidney. Occasional casts of this type mean very little. If persistent and fairly numerous they indicate definite kidney irritation and there should be careful examination of blood and kidney efficiency tests to determine the degree of damage. This cannot be accurately estimated from a single analysis of the urine. The urine gives danger signals only.

EPITHELIAL CELLS.—These are always being cast off from the bladder and the urinary passages. In small numbers they have no significance, in large numbers they indicate irritation somewhere in the urinary passage and require further investigation.

LEUCOCYTES.—These are white blood cells and are also present in matter or pus. They are present in most urine in small numbers and have little significance unless present in quantity when they may indicate infection or irritation somewhere in the urinary passages, especially the neck of the bladder or prostate in males. In females excess of these cells and of epithelial cells may be due to admixture with leucorrheal discharge. Proper precaution (douche before voiding specimen) will rule out this factor. When a slight trace of albumin is found in a specimen which also has numerous white blood cells, it is due to their presence and not important in itself.

ERYTHROCYTES.—These are red blood cells. In health they are rarely present except in small numbers. They indicate irritation, a congestion or ulceration at some point in the urinary passages or in the kidney itself. Continued showing of blood cells calls for expert investigation by a urologist.

CRYSTALS.—Many forms of crystals are present in normal urine. Unless commented on in the report they may be ignored. Urine that has stood deposits crystals of uric acid, oxalate of lime and other crystals without their having any significance unless present in great excess. Crystals of this type in freshly passed urine are of more importance and may indicate faulty diet or tendency to formation of stone.

CYLINDROIDS.—These are evidence of very slight kidney irritation, unimportant unless persistent.

MUCUS.—Mucus is found in normal urine in small amount. Excess may be due to temporary irritation in the genito-urinary tract but shreds are frequently associated with a diseased condition.

AMORPHOUS.—This is a non-crystalline deposit of mineral matter and may also be influenced by diet. It has no significance unless commented on in the report.

SPERMATOZOA.—Occasionally present in the urine of males. They are unimportant unless persistent. Their presence would account for a slight trace of albumin in the specimen.

NOTE:—It is a mistake to dwell with too much concern on the items of the report. Anything of real importance will be explained in the Institute's report or given due consideration by your physician. If anything in this report is not clear to you write this office for further information.

Fig. 54.—*Concluded*

URINE CONCENTRATION TEST

TIME	AMOUNT	SPECIFIC GRAVITY	UREA		CHLORIDES	
			%	Gm	%	Gm

ALBUMIN:

SUGAR:

MICROSCOPICAL EXAMINATION:—

RENAL EFFICIENCY TEST

	VOLUME	SPECIFIC GRAVITY	PERCENTAGE EXCRETED
1st hour			
2nd hour	_____		_____
Total excretion			

Fig. 55.—Urine concentration and renal efficiency test report forms.

No. Date

Name

Address

BLOOD EXAMINATION

CYTOLOGY

			Normal (Adults)
Erythrocytes	per cu. mm.	Male Female	5,000,000 — 5,500,000 4,500,000 — 5,000,000
Leucocytes	" " "		6,000 — 9,000
Platelets	" " "		226,000 — 367,000
Hemoglobin	gms. per 100 cc.,	percent of normal	Male 16.9 gms. Female 15.5 "
Hemoglobin Index			0.9 — 1.0
Coagulation Time		minutes	3 — 7
Differential Count			
Polynuclear Neutrophiles		percent	60 — 75
Lymphocytes		"	20 — 30
Endotheliocytes		"	5 — 8
Eosinophiles		"	2 — 4
Basophiles		"	0 — 0.5
Parasites			
Pathological Cells			
Description of Smear:—			

CHEMISTRY

(Specimen of blood taken	hours after last meal)	Normal
Urea Nitrogen	mgms. per 100 cc.	9 — 16
Non-Protein Nitrogen	" " "	25 — 37
Uric Acid	" " "	2 — 4
Creatinine	" " "	1 — 2
Sodium Chloride	" " "	450 — 500
Sugar	" " "	65 — 90*
(Urine Sugar percent)		None
Cholesterol	" " "	150 — 180
Serum Calcium	" " "	9 — 11
CO_2 Combining Power	Volumes percent	55 — 70
Icterus Index		3 — 5
Van Den Bergh Reaction Direct		Negative
Van Den Bergh Reaction Indirect		Negative
Phenoltetrachlorphthalein Test	percent at end of one hour	0 — 5

SUGAR TOLERANCE

	Urine			Blood
	Volume cc.	Sugar %	Sugar gms.	Mgms. per 100 cc.*
1.—Specimen fasting				
2.— " ½ hour				
3.— " 1½ "				
4.— " 2½ "				
Total				

* Benedict's revised standard J. B. C. May 1925.

Fig. 56.—Blood examination and sugar tolerance report forms.

CULTURES

Source:

Bacteria found:

SMEARS

Source:

Cells found:

Bacteria found:

SPUTUM

FIRST SPECIMEN

Character:

Cells found:

Bacteria found:

SECOND SPECIMEN

Character:

Cells found:

Bacteria found:

THIRD SPECIMEN

Character:

Cells found:

Bacteria found:

Fig. 57.—Bacteriological report form.

GASTRIC ANALYSIS

PHYSICAL APPEARANCE

CHEMICAL REACTION

		Present	Normal
Character:	Total Acidity		40 to 60
	Free Hcl		20 to 40
	Combined Hcl		
	Organic Acids & Acid Salts		
	Lactic Acid		
	Blood (chem.)		
	Bile		
	Mucus		

MICROSCOPICAL FINDINGS

GASTRIC ANALYSIS
(FRACTIONAL)

Meal:

	15	30	45	HR. 1	15	30	45	HR. 2
Free Hcl								
Total Acidity								
Lactic Acid								
Blood (chem.)								
Bile								
Mucus								
Description:								

MICROSCOPICAL EXAMINATION

FAECES ANALYSIS

PHYSICAL APPEARANCE

Character
Reaction
Color
Mucus

CHEMICAL REACTIONS

Blood (Test)
Bile.

MICROSCOPICAL FINDINGS

Gram Stain:

Fig. 58.—Gastric analysis report form.

COMPLEMENT FIXATION TESTS

1. WASSERMANN TEST

Reaction to Antigens { Alcoholic / Cholesterolized

(See box fixation 2½ to 4 hours according to antigens employed.)

COMMENT:

2. GONORRHEAL FIXATION TEST

Reaction to Specific Antigen:

COMMENT:

A negative result does not absolutely exclude the possibility of infection.

In the event of any result other than an absolute negative this report should be referred to your private physician.

Fig. 59.—Serological report form.

BASAL METABOLISM TEST

Name of Patient ..... Date .....

Address .....

Oxygen consumption

	First Period	Second Period
Time	Start	
	End	
Duration in minutes		
Spirometer scale or Kymogram	Start	
	End	
Oxygen consumed	Total cc.	
Temperature of oxygen	Start	
	End	
Temperature of room		
Barometer pressure		

Age

Height in. / cm.

Weight lbs. / Kg.

Body Temperature

Remarks of Operator:

Subject: co-operative, calm, quiet restless, nervous, irritable

Before Test			During Test		
Time	Pulse	Resp.	Time	Pulse	Resp.

Remarks of Patient:

Operator .....

Fig. 60.—Basal metabolism report form.

Name _____ Date _____

Address _____ Occupation _____ Age _____

PROTEIN SENSITIZATION TEST

I. Do you suffer with { Asthma _____ If yes, answer questions of Sections I and II. / Hay fever _____ If yes, answer questions of Sections I and III. / Skin conditions _____ If yes, answer questions of Sections I and IV.

How long? _____

Under what circumstances did it originally arise? _____

Does food, climate, season or environment affect your symptoms? If so, describe. _____

Do you sleep on a feather pillow or feather mattress? _____

Have you any pets at home? _____ What kind? _____

Does anybody in your family suffer with hay fever, asthma, hives, eczema, or any skin conditions? _____

(Use reverse, if necessary)

II. *For ASTHMA Cases*

Do you cough? _____ If so, do you produce sputum? _____

What type? _____ Is there any blood in it? _____

Do you have to sit up at night to breathe? _____

What relieves the sense of constriction in your chest? _____

Do you suffer with periodic headaches or backaches? _____

Is your asthmatic condition worse about the menstrual period? _____

Do you have asthma all year long or only at certain seasons? _____

If you "catch cold" is your asthma worse? _____

Are you subject to frequent colds? _____

(Use reverse, if necessary)

III. *For HAY FEVER Cases*

In what month or months does your hay fever start? _____

How long does it last? _____

Do you experience sneezing, congested nose, throat and eyes, or tightness in your chest? _____

What seems to relieve you? _____

Do you find more relief at the seashore or at the mountains? _____

Have you followed any course of treatment for it? _____

(Use reverse, if necessary)

IV. *For SKIN Cases*

To what foods, if any, are you able to trace your eruptions? _____

Are you constipated? _____

Have you any stomach trouble? _____

Does the skin condition cause itching? _____

How long have you had it? _____

Describe as best you can the nature and course of your skin condition _____

Fig. 61.—Personal history form used in suspected cases of protein sensitization.

PROTEIN SENSITIZATION

Name..... Address..... Date.....

	Group A—Meats		Group D—Fruits		Group J—Nuts		Group N—Pollens
1	Beef	61	Banana	107	Almond	150	Ash
2	Chicken	62	Cantaloupe	108	Brazil Nut	151	Birch
3	Duck	63	Fig	109	Chestnut	152	Black Walnut
4	Goose	64	Grapefruit	110	English Walnut	153	Cherry
5	Lamb	65	Orange	111	Peanut	154	Clover
6	Pork	66	Peach	112	Pecan	155	Clover (Sweet)
7	Squab	67	Pear		Group K—Beverages	156	Corn
8	Turkey	68	Pineapple	113	Cocoa	157	Dahlia
9	Veal	69	Plum	114	Coffee	158	Daisy
10		70	Prune	115	Tea	159	Daisy (Yellow)
11		71	Raspberry	116		160	Dandelion
12		72	Strawberry	117		161	Dock (Sorrel)
	Group B—Vegetables	73		118		162	Elm
13	Asparagus	74			Group L—Epidermal	163	Goldenglow
14	Bean	75		119	Cat Hair	164	Goldenrod
15	Beet		Group E—Crustaceans	120	Cattle Hair	165	Hickory
16	Buckwheat	76	Crab	121	Chicken Feather	166	June Grass
17	Cabbage	77	Lobster	122	Dog Hair	167	Maple
18	Carrot	78	Shrimp	123	Duck Feather	168	Oak
19	Celery	79		124	Goose Feather	169	Orchard Grass
20	Corn	80		125	Horse Dander	170	Pine
21	Cucumber	81		126	Mouse Hair	171	Poplar
22	Eggplant		Group F—Dairy Products	127	Rabbit Hair	172	Poppy
23	Lettuce	82	Casein	128	Sheep Wool	173	Privet
24	Lima Bean	83	Cheese	129		174	Ragweed (Giant)
25	Mushroom	84	Egg (Whole)	130		175	Ragweed (Short)
26	Mustard	85	Eggwhite	131		176	Red Top
27	Onion	86	Egg Yolk		Group M—Bacteria	177	Rose
28	Orris Root	87	Lactalbumin	132	Bac. Friedlander	178	Rye
29	Parsnip	88	Milk (Cow)	133	Diphtheroid	179	Rye Grass
30	Pea	89	Milk (Goat)	134	Mic. Catarrhalis	180	Sunflower
31	Potato	90	Milk (Human)	135	Micrococ-Tetrag	181	Sweet Vernal Grass
32	Radish	91		136	Pertussis	182	Timothy
33	Rhubard	92		137	Pneumococus No. 1	183	Willow
34	Spinach	93		138	Pneumococus No. 2	184	
35	Squash		Group G—Mollusks	139	Pneumococus No. 3	185	
36	Sweet Potato	94	Clams	140	Staph-Pyo-Alb.	186	
37	Tomato	95	Oysters	141	Staph-Pyo-Aur.	187	
38	Turnip	96	Scallops	142	Staph-Pyo-Cit.		Group O—Miscellaneous
39	Wheat	97	Snails	143	Strep-Hemolyticus	188	Beef Serum
40	Wheat Gliadin	98		144	Strep-Non-Hemo	189	Horse Serum
41	Wheat Globulin	99		145	Strep-Viridans	190	Tobacco
42	Wheat Glutenin	100		146		191	
43	Wheat Proteose		Group H—Cereals	147		192	
44		101	Barley	148		193	
45		102	Rice	149		194	
46		103	Rye			195	
	Group C—Fish	104					
47	Bluefish	105					
48	Codfish	106					
49	Haddock						
50	Halibut						
51	Mackerel						
52	Perch						
53	Pike						
54	Salmon						
55	Shad						
56	Smelts						
57	Sole						
58							
59							
60							

SPECIAL NOTE

An asterisk (*) placed before a number signifies that you have been tested with that particular protein. If no reaction occurred, no indication will be made.
Extent of reaction will be shown by the letter "X" as follows:
"X" doubtful.
"XX" weak positive
"XXX" positive.
"XXXX" strongly positive

Please refer to explanatory letter for the interpretation of findings.

Fig. 62.—Protein sensitization report form.

*Name*_____ *Date* _____ *No.*_____

Address _____

No. 1, upper left molars; No. 2, upper left cuspid and bicuspids; No. 3, upper incisors; No. 4, upper right cuspid and bicuspids; No. 5, upper right molars; No. 6, lower left molars; No. 7, lower left cuspid and bicuspids; No. 8, lower incisors; No. 9, lower right cuspid and bicuspids; No. 10, lower right molars

No. 1

No. 2

No. 3

No. 4

No. 5

No. 6

No. 7

No. 8

No. 9

No. 10

EXPLANATION

ALVEOLAR RESORPTION:—Partial absorption of the bony structure of the tooth socket usually the result of pyorrhoea but occurs normally in old age and after extraction of teeth.

APICAL RESORPTION:—Frequently means beginning infection. Should be re-X-rayed in few months to note any change.

CAPPED OR CROWNED TOOTH:—Caps may cover or replace the crown of the tooth and usually are of gold or porcelain.

IMPACTED TOOTH:—Most often third molars and cuspids; such teeth occupy abnormal positions and frequently are wedged in by other teeth and have not pierced the gum—sometimes are infected—sometimes cause neuralgia.

MOVEMENT:—If films are allowed to move while being exposed, the image is blurred and an accurate reading is frequently impossible. Films reported as showing movement will be retaken without charge.

PIVOTED TOOTH:—Usually capped with porcelain. Pivots may be seen in the root canals.

RETAINED FILLING PARTICLES:—These show as small white rounded or irregular areas in the region of a tooth socket after the tooth has been extracted.

RETAINED ROOT PARTICLES:—Remain after the greater part of the tooth has wasted away, through decay or are broken off during extraction. They act as foreign bodies and are frequently infected.

ROOT CANALS:—Normally contain nerve tissue. When canals are filled the nerves are dead and the tooth is practically non-vital.

ROOT CANAL FILLING:—Usually of material opaque to X-rays and can be seen in the roentgenogram as white lines. When filled with paraffin or similar material which is non-opaque to X-rays, it does not show in X-ray film. Root canals reported as partly filled may also contain non-opaque substance which cannot be seen in the X-ray film.

SHADOWS OR RADIOLUCENT AREAS:—Areas showing relative diminution in density. When sharply delimited and found near the apex of a pulpless tooth, it usually indicates infection.

Fig. 63.—Dental roentgenological report form.

*Name*_____ *Date*_____ *No.*_____
*Address*_____

EXAMINATION OF CHEST

Position:—

Bone density:—

Costal cartilages:—

Diaphragm:—

Heart:—

Aorta:—

Mediastinum:—

Right Lung:—

Left Lung:—

Comments:—

Fig. 64.—Roentgenological examination of the chest—report form.

*Name*_____ *Date*_____ *No.*_____
*Address*_____

DIGESTIVE TRACT

Chief Complaint:—

Fluoroscopic:—

Stomach:—

Caecum:—

Colon:—

Rectum:—

Comments:—

Fig. 65.—Roentgenological examination of the digestive tract—report form.

FLUOROSCOPIC SHEET[1] **No.** . . .

Name ..... **Sex M. F.** ..... **Age** ..... **Date** .....

Chief Complaint .....

.....

Reason for X-ray .....

.....

Previous X-rays **Date** **Diagnosis**

Abdominal Operation **Date**

Habitus—Normal Broad Enteroptic

Residue—None, Very Slight Slight Moderate Marked

Head I. C. H.F. T.C. S.F. D. S

Peristalsis Normal Active Vigorous Not Seen Anti-Peristalsis

Bulb Seen—Size—small, normal, dilated, regular, irregular—Not Seen

Duodenum Visualized Immediately Delayed Not Seen

Mobility Fixation, High Normal

Antrum Seen Regular Irregular Not Seen

Mobility Free Slightly Fixed Fixed

Filling Defects Card Media. Pylorica GC. LC.

Incisura Card. Media. Pylorica Transient

Hour-Glass Stomach Organic Intermittent Niche .....

Tender Point L.C., G.C. Duod. G.B. McB. Epig. Diverticulum .....

Trouble—Esophagus, Stomach, Bowels, Duration ..... Increased Severity .....

Pain—Slight, severe, dull, gnawing, fullness, distress, where .....

radiates ..... continuous .....

intermittent ..... frequency ..... duration .....

after meals ..... night, time ..... any time .....

Aggravated by food Quantity Solid Acid

Relieved by food Soda Belching Vomiting Fats Fibrous

Stomach feels better full Formerly Now

Stomach feels better empty Formerly Now

Vomits—Rarely, occasionally, often ..... blood, ... mucus, bile,

forced, delayed, tube .....

Sour Stomach ..... **Gas** ..... **Jaundice, sl., distinct** ..... **Cramps** .....

Morph .....

B.M.—Regular, constipation, diarrhoea, black, clay, blood, mucus.

Typhoid ..... Alcohol .....

Weight—Increasing, stationary, off ..... lbs. in ..... **Reduced Diet** .....

General Condition—Good, fair, poor. weakness, emaciation, pallor, appetite .....

[1] Adapted from fluoroscopic sheet suggested by Dr. Russell D. Carman of the Mayo Clinic. "The Roentgenologic Diagnosis of Diseases of the Alimentary Canal," Philadelphia, W. B. Saunders Company, p. 30.

Fig. 66.—Fluoroscopic examination of gastro-intestinal tract (office record).

Name ..... *Date* ..... *No.* .....

Address .....

X-Ray Examination of Heart and Aorta
(Teleroentgenogram)

Target plate distance

Angle of inclination of heart

Shape of heart

Shape of aorta

Location of apex

Total transverse diameter of heart

Diameter of aorta

Transverse diameter of thorax

Note:—Subject erect and film taken in postero-anterior position.

Comments:—

Fig. 67.—Roentgenological examination of heart and aorta—report form.

NAME_____ AGE____DATE____
Last First

COMPLAINT Referable to HEART and Circulation UNDERWEIGHT____
OVERWEIGHT____

HISTORY:---Rheumatism, neuritis, chorea, scarlatina, diptheria, GC., syphilis, mouth infection, tuberculosis, pneumonia, tonsillitis, pleurisy.

DRUGS:---- Alcohol, Coffee, Tea, Cigars, Cigarettes, Pipes; Digitalis, Morphine, Bromides, Belladonna; Mercury, Iodids, Nitrites, Acetanilid

EXERCISE:

PULSE Rate Sitting: per minute - Character
Standing: per minute - Character
Equality Rhythm Deficit
After exercise: 0-10 sec.
-------Swing of 60-70 "
-------lb. dumb-bell 120-130 "
Dyspnoea Distress Time return to normal -------minutes
RADIALS:
BRACHIALS:
OTHERS:

BLOOD PRESSURE:- Sitting - Systolic Diastolic
3 min. after exercise Sitting - Systolic Diastolic
Optional (Recumbent - Systolic Diastolic
(Standing - Systolic Diastolic

HEART ENLARGED:--None, slight, moderate, marked.
Apex beat felt percussed in space inches to left of midline.
Visible Pulsation
Aortic Dullness inches to R and inches to L at 2nd interspace.
Cardiac Dullness inches to R at 4th interspace and inches to L at interspace. Rib.

Fig. 68.—Special physical examination of heart—history and physical findings (office record).

ABNORMAL PULSATIONS

THRILLS

TRACHEAL TUG

Description:-- 1st sound at apex

at base

2nd sound at apex

at base

A2 P2

MURMURS:-

Effected by Respiration or change of posture

Reduplicated Sounds

Premature Contractions

Compensation:

Edema

General Findings:

Impression:

Recommendations:-

M. D.

Fig. 68.—*Concluded.*

*Name*_____ *Date*_____ *No.*_____

Address _____

ELECTROCARDIOGRAPHIC EXAMINATION

A study of the electrocardiogram reveals the following:—

Ventricular Rate

Rhythm

Amplitude

Preponderance

Conduction Time

Other findings

Fig. 69.—Electrocardiographic report form.

SPECIMEN REPORT[1]

January 1926

Miss Jane Doe,

_____

My dear Miss Doe:

We feel that the results of your physical examination warrant our urging you to take the enclosed detailed report to your physician for his advice in regard to your heart and pelvic organs. We believe that a further detailed examination should be made of the latter. We do not feel justified in giving any detailed instructions in regard to your exercise, as this should be regulated by your own physician. We do, however, enclose a dietary which we ask you to submit to him for his approval.

The X-ray of your teeth showed evidence of infection. Removal of these teeth should be discussed with your physician.

If there is anything in the report not clear to you and you are in doubt as to what course to pursue, do not hesitate to write us for further explanation.

Very truly yours,

_____, M. D.

Fig. 70.—Specimen report—letter of counsel.

[1] In order to avoid repetition, the reports on supplementary investigations, diet and exercise instructions, and educational leaflets pertaining to the individual needs of the subject examined are not included in the specimen report. The blank forms on which these reports are made, however, will be found in this section.

COMMENTS AND COUNSEL ON RESULTS OF HEALTH SURVEY HEREIN RECORDED

January , 192 6

Miss Jane Doe,
Name

Address

Rating D Age 49

TO THE FAMILY PHYSICIAN:

Dear Doctor:

The above named member of the Institute was recently examined. Attached is a copy of the detailed report* of the physical examination. Below is an analysis of the findings and suggestions of our examining and reviewing physicians made from the life extension standpoint.

HISTORY

Reason for coming to the Institute:- General examination.
Family and past personal history:- Excellent longevity — parents. Pneumonia — 1893 and 1899. Influenza — 1921. "Infected kidney" — 1924. Symptoms of heart weakness. Infected gall bladder. Moderate constipation.
Recent history:- Shortness of breath. Palpitation. Nocturia. Slight vaginal bleeding since menopause in 1920.

FAULTS IN HYGIENE

Rapid eating.
Lack of systematic exercise.

SIGNIFICANT PHYSICAL AND LABORATORY FINDINGS WITH COMMENT

Slight cardiac enlargement. Systolic and diastolic murmurs at apex, former transmitted to axilla. Blood pressure sys. 100, dias. 54. Pulse 112; irregular. Two meter x-ray shows moderate cardiac enlargement. Electrocardiogram shows auricular fibrillation:- Continuous observation.
Uterus - anterior and lateral hardness. Upper vagina feels softly granular. Examination unsatisfactory on account of tight hymen:- Further gynecological observation with possible examination under anesthesia.
Defective vision both eyes not fully corrected:- Refraction by oculist.
Extensive dentistry. X-ray shows extensive alveolar resorption with evidence of apical infection of left upper incisors:- Removal of infected teeth, particularly in view of circulatory disturbance.
Chronic dermatitis:- Local treatment.
Scoliosis with shortened left leg.
Hemoglobin 79% (Newcomer technique).
Urine - specific gravity 1.004, moderate number of leucocytes; otherwise, negative:- Re-examination with urine concentration test if findings are persistent.

Minor physical impairments are listed on the detailed report, but are not considered to be at present affecting the general health.

Diet suggestions and educational leaflets accompany the report; they are all subject to your approval.

Examining Physician:

_____ _____M. D.

*Laboratory and x-ray reports accompany detailed report.

Fig. 71.—Specimen report—letter to family physician.

NAME Miss Jane Doe

1. OCCUPATION

Librarian.

2. FAMILY HISTORY

See abstract to physician.

On this sheet is a complete record of the findings of the physical examination. The important items are listed and commented upon in the letter to your physician which accompanies it.

3. PERSONAL HISTORY

See abstract to physician.

4. EYES

Right 20/70 Left 10/200 Corrected to not fully

Eye Grounds Astigmatism Yes Color Vision -

Disease of eyes or eyelids Slight imbalance of eye muscles. Conjunctiva slightly red.

5. EARS

Right 10/10 Left 10/10

Canal and Drum Drums slightly retracted.

6. NOSE AND THROAT

Septum slightly deviated to right.
Turbinates slightly catarrhal.
Tonsils slightly buried and cryptic.
Mucosa of nose and throat slightly dry.

7. MOUTH, TEETH AND GUMS

See X-ray report of teeth.
Extensive dentistry.
Missing teeth.
Recession of gums.

8. PHYSIQUE

Height (net) 5 Ft. 1.2 In. Chest at rest 31½ In. Abdomen 32 In.

Present weight 107½ Lbs. (net) Posture ---

" " - Lbs. (coat and vest, or dress off) Musculature Moderately firm.

Skeleton and Extremities Shorter left leg.
Scoliosis.

9. CIRCULATION

Pulse 112 per min. Character Irregular Hemoglobin 79 % 12.4 gms.

" 104 " " (2 min. after exercise) Body Temperature 98.4 °

Blood Pressure: Systolic 100 Diastolic 54 Left
" " 96 60 Right (before exercise)
88 60
(2 min. after exercise)

Blood Vessels: Radials (at wrist), Brachials (at elbow), Retinals (internal eye), Temporals, Other — Moderately thickened

Heart

Slight enlargement to left.
Systolic and diastolic murmurs at apex, former transmitted to axilla, heard in recumbency, before and after exercise.
See X-ray report of heart and aorta and report of electrocardiogram.

Age	Systolic: Women, mm.	Men, mm.
20	116	120
30	119	122
40	124	125
50	130	129
60	134	134
All ages	121	124

In health the blood-pressure may vary temporarily 15 mm. above or below the average. Wide variations sometimes occur from slight nervous troubles. Pressures persistently above or below the average, however, should be carefully studied and followed up.

Blood-pressure of women is distinctly lower than that of men at the earlier ages. There are only slight differences at later ages.

Pulse pressure is the difference between systolic and diastolic and ranges normally from 30 to 55 mm.

Fig. 72.—Specimen report—detailed record of physical findings.

10. LUNGS

Normal.

11. ABDOMINAL ORGANS

Statement of slight constipation.
History of occasional pains in epigastrium after eating.
Sphincter muscle at anus tight.

12. BRAIN AND NERVOUS SYSTEM

Normal.

13. SKIN, LYMPHATICS, AND VEINS

Statement of occasional pruritis at anus.
Chronic skin changes.

14. ENDOCRINE GLANDS

Normal.

15. GENITO URINARY

Upper vagina soft, granular.
Moderate muco-purulent discharge.
Anterior and lateral hardness. History of spotting.
History of profuse menstruation.

16. URINARY REPORT

PHYSICAL CHARACTERISTICS

Specific Gravity	1.004
Transparency	clear
Color	straw
Odor	
Reaction	acid

CHEMICAL REACTION

Albumin	none
Sugar	none
Acetone	
Diacetic Acid	
Bile	

MICROSCOPIC EXAMINATION
Centrifugalized Specimen

Casts	none
Hyaline	
Granular	
Epithelial	
Epithelial Cells	very numerous
Leucocytes (white blood cells)	very numerous
Pus	none
Crystals	none
Erythrocytes	none
Mucus	few threads
Cylindroids	none
Amorphous	none

Fig. 72.—*Concluded.*

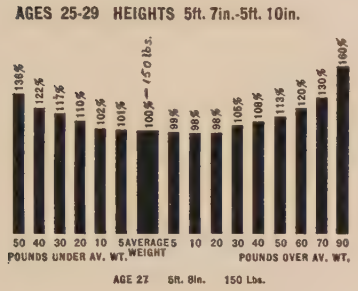
Height and Weight Tables

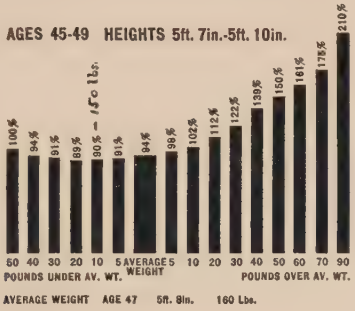
The accompanying charts demonstrate that in the absence of pathology *the average weight for age thirty is the ideal weight to maintain throughout maturity.*

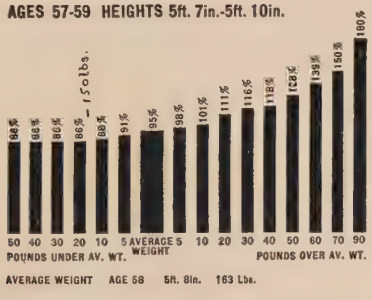
Influence of Weight on Vitality

Percentage of Standard Insurance Mortality in Various Weight Groups—Men

Based Upon the Report of the Medico-actuarial Investigation 1912—*Period* 1885–1908. *Underweight* 531,793 *Entrants. Overweight* 188,354 *Entrants. Average* 24,526 *Entrants.*







The percentages shown in the charts indicate the death rate at the designated age and weight as compared to the general death rate among insured risks of the same age. For example, 120 per cent. means that in that particular weight group the death rate was 20 per cent. higher than among all risks of the same age; 94 per cent. means that the death rate in that weight group was 6 per cent. lower than among all risks of that age.

Note that in the middle-aged and elderly groups there is approximately one point higher death rate for every pound of overweight; that is, 40 pounds overweight shows 39 per cent. extra mortality, 50 pounds overweight, 50 per cent. extra mortality. In all three charts, viz., at the "100 per cent." point, weights show a very favorable death rate, even lower than among those of average weight, indicating that the man

TABLE OF HEIGHTS AND WEIGHTS BASED UPON THE REPORT OF THE MEDICO-ACTUARIAL INVESTIGATION, 1912, COVERING AN ANALYSIS OF 221,819 MEN AND 136,504 WOMEN

TABLE OF AVERAGE HEIGHTS AND WEIGHTS—MEN

Age.	5 feet, 0 inch.	5 feet, 1 inch.	5 feet, 2 inches.	5 feet, 3 inches.	5 feet, 4 inches.	5 feet, 5 inches.	5 feet, 6 inches.	5 feet, 7 inches.	5 feet, 8 inches.	5 feet, 9 inches.	5 feet, 10 inches.	5 feet, 11 inches.	6 feet, 0 inch.	6 feet, 1 inch.	6 feet, 2 inches.	6 feet, 3 inches.	6 feet, 4 inches.	6 feet, 5 inches.
15.....	107	109	112	115	118	122	126	130	134	138	142	147	152	157	162	167	172	177
20.....	117	119	122	125	128	132	136	140	144	148	152	156	161	166	171	176	181	186
25.....	122	124	126	129	133	137	141	145	149	153	157	162	167	173	179	184	189	194
30.....	**126**	**128**	**130**	**133**	**136**	**140**	**144**	**148**	**152**	**156**	**161**	**166**	**172**	**178**	**184**	**190**	**196**	**201**
35.....	128	130	132	135	138	142	146	150	155	160	165	170	176	182	189	195	201	207
40.....	131	133	135	138	141	145	149	153	158	163	168	174	180	186	193	200	206	212
45.....	133	135	137	140	143	147	151	155	160	165	170	176	182	188	195	202	209	215
50.....	134	136	138	141	144	148	152	156	161	166	171	177	183	190	197	204	211	217
55.....	135	137	139	142	145	149	153	158	163	168	173	178	184	191	198	205	212	219

TABLE OF AVERAGE HEIGHTS AND WEIGHTS—WOMEN

Age.	4 feet, 8 inches.	4 feet, 9 inches.	4 feet, 10 inches.	4 feet, 11 inches.	5 feet, 0 inch.	5 feet, 1 inch.	5 feet, 2 inches.	5 feet, 3 inches.	5 feet, 4 inches.	5 feet, 5 inches.	5 feet, 6 inches.	5 feet, 7 inches.	5 feet, 8 inches.	5 feet, 9 inches.	5 feet, 10 inches.	5 feet, 11 inches.	6 feet, 0 inch.
15.....	101	103	105	106	107	109	112	115	118	122	126	130	134	138	142	147	152
20.....	106	108	110	112	114	116	119	122	125	128	132	136	140	143	147	151	156
25.....	109	111	113	115	117	119	121	124	128	131	135	139	143	147	151	154	158
30.....	**112**	**114**	**116**	**118**	**120**	**122**	**124**	**127**	**131**	**134**	**138**	**142**	**146**	**150**	**154**	**157**	**161**
35.....	115	117	119	121	123	125	127	130	134	138	142	146	150	154	157	160	163
40.....	119	121	123	125	127	129	132	135	138	142	146	150	154	158	161	164	167
45.....	122	124	126	128	130	132	135	138	141	145	149	153	157	161	164	168	171
50.....	125	127	129	131	133	135	138	141	144	148	152	156	161	165	169	173	176
55.....	125	127	129	131	133	135	138	141	144	148	153	158	163	167	171	174	177

(Height and weight taken with shoes on and coat and vest or waist off.)

of average weight is either overfed or underexercised, or both. It has been possible for the life insurance companies to select a very favorable class of lightweight, but impossible, in spite of their care in selection, to secure a favorable type of heavyweight. Apparently all heavyweights, regardless of type, are at a disadvantage as compared to the good lightweights. Lightweight, therefore, after full maturity, is an advantage unless it is due to some form of disease or malnutrition. "A

lean horse for a long race" is a motto justified by life insurance experience. In early life the risk of overnutrition rather than undernutrition should be taken, but *after thirty* one should watch his weight and *keep it at the average weight for that age.* Note that this weight (for 5 feet, 8 inches) is 150 pounds and that the 150-pound man has about the minimal mortality in all three charts, viz., at the "100 per cent." point in the first chart, the "90 per cent." point in the second, and the "87 per cent." point in the third.

In arriving at the ideal weight some allowance must, of course, be made for the physical type of the individual. Three main types are recognized: (*a*) Those with light framework;

Net Weight and Height—Men[1]

Age.	4 ft., 11 in.	5 ft., 0 in.	5 ft., 1 in.	5 ft., 2 in.	5 ft., 3 in.	5 ft., 4 in.	5 ft., 5 in.	5 ft., 6 in.	5. ft., 7 in.	5 ft., 8 in.	5 ft., 9 in.	5 ft., 10 in.	5 ft., 11 in.	6 ft., 0 in.	6 ft., 1 in.	6 ft., 2 in.	6 ft., 3 in.	6 ft., 4 in.
15	102	104	107	110	113	117	121	125	129	133	137	142	147	152	157	162	167	172
20	112	114	117	120	123	127	131	135	139	143	147	151	156	161	166	171	176	181
25	117	119	121	124	128	132	136	140	144	148	152	157	162	168	174	179	184	189
30	121	123	125	128	131	135	139	143	147	151	156	161	167	173	179	185	191	196

Net Weight and Height—Women[2]

Age.	4 ft., 7 in.	4 ft., 8 in.	4 ft., 9 in.	4 ft., 10 in.	4 ft., 11 in.	5 ft., 0 in.	5 ft., 1 in.	5 ft., 2 in.	5 ft., 3 in.	5 ft., 4 in.	5 ft., 5 in.	5 ft., 6 in.	5 ft., 7 in.	5 ft., 8 in.	5 ft., 9 in.	5 ft., 10 in.	5 ft., 11 in.
15	98	100	102	103	104	106	109	112	116	120	124	128	132	136	140	145	150
20	103	105	107	109	111	113	117	120	123	126	130	134	138	141	145	149	154
25	106	108	110	112	114	116	119	122	126	129	133	137	141	145	149	152	156
30	109	111	113	115	117	119	122	125	128	132	136	140	144	148	152	155	159

(*b*) those with medium framework; (*c*) those with heavy framework.

While no hard-and-fast lines can be drawn, in a general way it may be stated that for the *light* type a reduction of 10 per cent. may be allowed, although even this type should guard against extreme light weight during early and middle life. When the framework is *heavy* an increase of 12 per cent. may be allowed, but the individual should still regulate his diet and activities in order to combat any tendency to increase in weight.

[1] Adjusted from Medico-Actuarial Tables by subtracting 1 inch from height in shoes, and 5 pounds from weight in clothes.

[2] Adjusted from Medico-Actuarial Tables by subtracting $1\frac{1}{2}$ inches from height in shoes, and 4 pounds from weight in clothes.

The *medium* type would do well to keep the weight down to these standards or slightly below them in later years.

The *net* weight for men and women of medium framework at certain ages is presented in the tables on page 345.

Height and Weight of Children

Following are standard height and weight tables for boys and girls[1]:

WEIGHT—HEIGHT—AGE TABLE FOR BOYS FROM BIRTH TO SCHOOL AGE

Height (inches)	Average weight for Height (Pounds)	1 mo.	3 mos.	6 mos.	9 mos.	12 mos.	18 mos.	24 mos.	30 mos.	36 mos.	48 mos.	60 mos.	72 mos.
20	8	8											
21	9½	9	10										
22	10½	10	11										
23	12	11	12	13									
24	13½	12	13	14									
25	15	13	14	15	16								
26	16½		15	17	17	18							
27	18		16	18	18	19							
28	19½			19	19	20	20						
29	20½			20	21	21	21						
30	22			22	22	22	22	22					
31	23				23	23	23	23	24				
32	24½				24	24	24	25	25				
33	26					26	26	26	26	26			
34	27						27	27	27	27			
35	29½						29	29	29	29	29		
36	31							30	31	31	31		
37	32							32	32	32	32	32	
38	33½								33	33	33	34	
39	35								35	35	35	35	
40	36½									36	36	36	36
41	38										38	38	38
42	39½										39	39	39
43	41½										41	41	41
44	43½											43	43
45	45½											45	45
46	48												48
47	50												50
48	52½												52
49	55												55

Notes:

1. Weight is stated to the nearest pound; height, to the nearest inch; age, to the nearest month.
2. Up to and including 34 inches the *weights are net*. Above this the following amounts have been added for clothing (shoes, coats, and sweaters are not included):

35 to 39 in. 1¼ pounds. 40 to 44 in. 1½ pounds. 45 to 49 in. 1¾ pounds.

Fig. 73.—The Woodbury weight-height-age table for boys from birth to school age.

[1] Woodbury, Robert M., Ph.D.: Tables for Infancy and Early Childhood. Baldwin, Bird T., Ph.D., and Thomas D. Wood, M. D.: Tables for Boys and Girls of School Age. Supplement to July, 1923, issue of *Mother and Child*, Published by American Child Health Association, New York City.

WEIGHT—HEIGHT—AGE TABLE FOR GIRLS FROM BIRTH TO SCHOOL AGE

Height (Inches)	Average Weight for Height (Pounds)	1 mo.	3 mos.	6 mos.	9 mos.	12 mos.	18 mos.	24 mos.	30 mos.	36 mos.	48 mos.	60 mos.	72 mos.
20	8	8											
21	9	9	10										
22	10½	10	11										
23	12	11	12	13									
24	13½	12	13	14	14								
25	15	13	14	15	15								
26	16½		15	16	17	17							
27	17½		16	17	18	18							
28	19			19	19	19	19						
29	20			19	20	20	20						
30	21½			21	21	21	21	21					
31	22½				22	22	23	23	23				
32	24					23	24	24	24	25			
33	25						25	25	25	26			
34	26½						26	26	26	27			
35	29						29	29	29	29	29		
36	30							30	30	30	30	31	
37	31½							31	31	31	31	32	
38	32½								33	33	33	33	
39	34								34	34	34	34	34
40	35½									35	36	36	36
41	37½										37	37	37
42	39										39	39	39
43	41										40	41	41
44	42½											42	42
45	45												45
46	47½												47
47	50												50
48	52½												52

NOTES:
1. Weight is stated to the nearest pound; height, to the nearest inch; age, to the nearest month.
2. Up to and including 34 inches the *weights are net*. Above this the following amounts have been added for clothing (shoes and sweaters are not included) 35 to 39 in. 1 pound. 40 to 44 in. 1½ pounds. 45 to 49 in. 1¾ pounds.

Fig. 74.—The Woodbury weight-height-age table for girls from birth to school age.

During the first year a record of the height and weight of the child is indispensable. Up to the sixth month the child should be weighed every week, and between the sixth month and the end of the first year, every two weeks. Older children should be weighed and measured at regular intervals and a chart kept which should be compared with the standard.

Variations between 10 per cent. above and 10 per cent. below the standard are not serious. But if a child is 10 or more per cent. below the standard in weight for height and age, he should receive a thorough physical examination in order to find the cause of the underweight. Malnutrition should be promptly corrected under the supervision of a pediatrist.

In general, increased weight should parallel increased height.

WEIGHT—HEIGHT—AGE TABLE FOR BOYS OF SCHOOL AGE

Height (inches)	Average weight for height (lbs.)	5 Years	6 Years	7 Years	8 Years	9 Years	10 Years	11 Years	12 Years	13 Years	14 Years	15 Years	16 Years	17 Years	18 Years	19 Years	Height (inches)
38	34	34	34*														38
39	35	35	35														39
40	36	36	36*														40
41	38	38	38	38*													41
42	39	39	39	39*	39*												42
43	41	41	41	41*	41*												43
44	44	44	44	44	44*												44
45	46	46	46	46	46*	46*											45
46	48	47*	48	48	48	48*											46
47	50	49*	50	50	50	50*	50*										47
48	53		52	53	53	53	53*										48
49	55		55	55	55	55	55	55*									49
50	58		57*	58	58	58	58	58*	58*								50
51	61			61	61	61	61	61	61*								51
52	64			63	64	64	64	64	64	64*							52
53	68			66*	67	67	67	67	68	68*							53
54	71				70	70	70	70	71	71	72*						54
55	74				72*	72	73	73	74	74	74*						55
56	78				75*	76	77	77	77	78	78	80*					56
57	82					79*	80	81	81	82	83	83*					57
58	85					83*	84	84	85	85	86	87					58
59	89						87	88	89	89	90	90	90				59
60	94						91*	92	92	93	94	95	96				60
61	99							95	96	97	99	100	103	106*			61
62	104							100*	101	102	103	104	107	111	116*		62
63	111							105*	106	107	108	110	113	118	123	127*	63
64	117								109	111	113	115	117	121	126	130*	64
65	123								114*	117	118	120	122	127	131	134	65
66	129									119	122	125	128	132	136	139	66
67	133									124*	128	130	134	136	139	142	67
68	139										134	134	137	141	143	147	68
69	144										137	139	143	146	149	152	69
70	147										143	144	145	148	151	155	70
71	152										148*	150	151	152	154	159	71
72	157											153	155	156	158	163	72
73	163											157*	160	162	164	167	73
74	169											160*	164	168	170	171	74

Age—years		6	7	8	9	10	11	12	13	14	15	16	17	18	19	
Average height (inches)	Short	43	45	47	49	51	53	54	56	58	60	62	64	65	65	
	Medium	46	48	50	52	54	56	58	60	63	65	67	68	69	69	
	Tall	49	51	53	55	57	59	61	64	67	70	72	72	73	73	
Average annual gain (lbs.)	Short	3	4	5	5	5	4	8	9	11	14	13	7	3		
	Medium	4	5	6	6	6	7	9	11	15	11	8	4	3		
	Tall	5	7	7	7	7	8	12	16	11	9	7	3	4		

Notes Referring to Weight-Height-Age Tables for Boys and Girls of School Age.

The tables are to be used as follows:

Take, for example, a 14 year old boy who is 64 inches tall. By following the numbers horizontally opposite the figure 64 it will be found that he shuold weigh 113 pounds. A 12 year old boy who is 64 inches tall should weigh 109 pounds and an 18 year old boy should weigh 126 pounds.

Age is taken at the nearest birthday; height, at the nearest inch; and weight, at the nearest pound. A child is considered 6 years old at any time between 5½ and 6½ years.

The figures not starred represent exact averages in round numbers.

The starred figures represent smoothed or interpolated values.

Fig. 75.—The Baldwin-Wood weight-height-age table for boys of school age.

WEIGHT—HEIGHT—AGE TABLE FOR GIRLS OF SCHOOL AGE

Height (inches)	Average weight for height (lbs.)	5 Years	6 Years	7 Years	8 Years	9 Years	10 Years	11 Years	12 Years	13 Years	14 Years	15 Years	16 Years	17 Years	18 Years	Height (inches)
38	33	33	33													38
39	34	34	34													39
40	36	36	36	36*												40
41	37	37	37	37*												41
42	39	39	39	39*												42
43	41	41	41	41	41*											43
44	42	42	42	42	42*											44
45	45	45	45	45	45	45*										45
46	47	47*	47	47	48	48*										46
47	50	49*	50	50	50	50	50*									47
48	52		52	52	52	52	53*	53*								48
49	55		54	54	55	55	56	56*								49
50	58		56*	56	57	58	59	61	62*							50
51	61			59	60	61	61	63	65							51
52	64			63*	64	64	64	65	67							52
53	68			66*	67	67	68	68	69	71*						53
54	71				69	70	70	71	71	73*						54
55	75				72*	74	74	74	75	77	78*					55
56	79					76	78	78	79	81	83*					56
57	84					80*	82	82	82	84	88	92*				57
58	89						84	86	86	88	93	96*	101*			58
59	95						87	90	90	92	96	100	103*	104*		59
60	101						91*	95	95	97	101	105	108	109	111*	60
61	108							99	100	101	105	108	112	113	116	61
62	114							104*	105	106	109	113	115	117	118	62
63	118								110	110	112	116	117	119	120	63
64	121								114*	115	117	119	120	122	123	64
65	125								118*	120	121	122	123	125	126	65
66	129									124	124	125	128	129	130	66
67	133									128*	130	131	133	133	135	67
68	138									131*	133	135	136	138	138	68
69	142										135*	137*	138*	140*	142*	69
70	144										136*	138*	140*	142*	144*	70
71	145										138*	140*	142*	144*	145*	71
Age-Years			6	7	8	9	10	11	12	13	14	15	16	17	18	
Average Height (inches)	Short		43	45	47	49	50	52	54	57	59	60	61	61	61	
	Medium		45	47	50	52	54	56	58	60	62	63	64	64	64	
	Tall		47	50	53	55	57	59	62	64	66	66	67	67	67	
Average Annual Gain (lbs.)	Short		4	4	4	5	6	6	10	13	10	7	2	1		
	Medium		5	5	6	7	8	10	13	10	6	4	3	1		
	Tall		6	8	8	9	11	13	9	8	4	4	1	1		

Notes—Continued.

For Boys:

The following percentage of net weight has been added for clothing (shoes, coats, and sweaters are not included):

For weights from 35 to 63 lbs.—3.5 per cent. of net weight is added.
For weights 64 lbs. and over—4 per cent. of net weight is added.

For Girls:

The following percentage of net weight has been added for clothing (shoes and sweaters are not included):

For weights from 35 to 65 lbs.—3 per cent. of net weight is added.
For weights from 66 to 82 lbs.—2.5 per cent. of net weight is added.
For weights from 83 lbs. and over—2 per cent. of net weight is added.

Fig. 76.—The Baldwin-Wood weight-height-age table for girls of school age.

THE SIGNIFICANCE OF VARIATIONS IN BLOOD-PRESSURE

A recent important study from life insurance sources,[1] covering the experience of twenty-six life insurance companies on 707,000 policy-holders, affords important information bearing on the significance of variations in blood-pressure as affecting mortality. These studies show that the average blood-pressure, even in later life, is lower than the figures often too confidently accepted as standards in clinical circles, but that probably the optimal pressure is still lower than the average shown in the study.

The conclusions of the Committee, based on this very broad investigation, are as follows:

1. The mortality is lower than the average when the systolic or diastolic, taken by itself, is somewhat below the average, but no information is yet available regarding the effect of very low blood-pressure. The average blood-pressure does not, therefore, appear to be the point of lowest mortality.

2. The good effect of a systolic or diastolic pressure slightly below the average is likely to be greater at the younger than at the older ages.

3. The mortality increases rapidly with the increase in blood-pressure over the average.

4. Substantial departures from the average blood-pressure are less significant in the case of pulse pressure than in the case of either systolic or diastolic pressure.

It is a remarkable and interesting fact that the mortality curve on blood-pressure is very similar to that on build; that is, it has been found that the average weight is not the point of lowest mortality and that there is a progressive increase in the death rate as the weight rises above the average. After full maturity the lowest death rate is found among those types substantially below the average weight.

The blood-pressure investigation shows that the point of lowest mortality is not that of the average blood-pressure, and that the death rate rapidly increases with increase in blood-pressure. Low death rates were found among those types

[1] Report of the Joint Committee on Mortality of the Association of Life Insurance Medical Directors and the Actuarial Society of America—Arthur Hunter, Chairman, New York, 1925.

showing blood-pressure substantially below the average. This does not include, however, cases of extremely low blood-pressure.

It should be borne in mind that these studies were made on groups of people supposedly free from any pathology and simply presenting these variations in blood-pressure. It seems evident that in the high pressure group there was a higher ratio of undetected, underlying pathology; in the low pressure group there was a lower ratio of undetected pathology.

The complacency with which many clinicians look upon a pressure in elderly life of 150 to 160 is not justified by the mortality records. Such pressures are very common at that age, but they warrant a careful search for causative factors and underlying pathology. All things being equal, a pressure of 10 or 15 millimeters below the average for the age may be taken as a favorable factor; but one must be sure that a thorough search has been made for all forms of pathology which might be influential in lowering the blood-pressure.

A summary of the blood-pressure standards developed by this investigation will be found on page 86.

OFFICE RECORDS

For ordinary records the following card will be found of practical value:

Name Exam. For confidential record (if desired) in Examiner's office file.	
C. C.	
History	
Cause?	
Glasses needed	B. P. / /
Ears | Nasal obs.	Pulse | Arteries
Tonsils	Heart funct. — organic
Teeth | X-Ray adv.	
Overwt. / Underwt. } Recent { Gain / Loss	Lungs

(Reverse)

Abd.	701 Feet Long. Trans.
	Spine
C. N. S.	Hernia rt. lt.
	truss — needed - worn - satisfactory
Endocrines	G. U.
Lymphatics	GYN.
Skin changes	
Varicose veins	Rectum
Follow-up	
Urine	

Fig. 77.—Office record card.

The following codes which were devised for the purpose of taking off statistical data covering the history, physical findings, and results of supplementary laboratory and x-ray investigations, will be found serviceable in developing a comprehensive picture of the possible scope of office records where such records are essential for statistical study:

CODES FOR USE IN CONNECTION WITH HOLLERITH CARDS, HAVING 45 FIELDS WITH 12 CODE NUMBERS TO EACH FIELD.

Fields 1-6 for Registration number.
" 7-9 " Group identification number.
" 10 " Number of examination (first or re-exam.)
" 11,12 " Occupation code number (see attached).
" 13 " Race and sex code number (see attached).
" 14,15 " Age.
" 16 " Weight code number (see attached).
" 17 " Height code number (see attached).
" 18 " Rating code number (see attached).
" 19 " Family History code number (see attached).
" 20-45 " Impairment code numbers (see attached).

CLASSIFICATION OF IMPAIRMENTS

A.—Personal History.
B.—Personal History.
C.—Errors of diet and hygiene.
D.—Effects of occupation.
E.—Build, weight and posture.
F.—Ears and eyes.
G.—Nose and throat.
H.—Teeth and root infection.
I.—Heart and pulse.
J.—Blood-vessels and blood-pressure.
K.—Lungs and other respiratory.
L.—Stomach and abdominal organs.
M.—Abdominal organs and inguinal region.
N.—Genito-urinary.
O.—Brain and nervous system.
P.—Endocrine disturbances.
Q.—Miscellaneous impairments.
R.—Miscellaneous impairments.
S.—Urinalysis.
T.—Urinalysis, continued, and blood urea.
U.—Special tests.
V.—Special tests.
W.—Tumors, benign or malignant, found or suspected.
X.—X-rays made.
Y.—X-ray of heart and chest.
Z.—Follow-up record.

Fig. 78.—Codes for use in connection with Hollerith cards.

OCCUPATION CLASSIFICATION

Alphabetically Arranged.

49. Accountants and auditors.
67. Actors and public entertainers
40. Agents.
1. Agricultural workers.
50. Architects and draftsmen.
51. Artists.
52. Authors.
16. Bakers.
71. Bankers.
64. Barbers
18. Blacksmiths.
84. Boarding house keepers.
68. Bookkeepers.
22. Brick, pottery, terra cotta, and tile makers.
7. Bricklayers.
71. Brokers.
4. Builders.
82. Butchers
41 Buyers and purchasing agents.
5. Carpenters.
72. Cashiers.
86. Chauffeurs.
53. Chemists.
54. Clergymen.
68. Clerks.
14. Clothing operatives.
40. Collectors.
44. Commissioned officers of the Army and Navy
4. Contractors.
87. Cutters.
55. Dentists.
51. Designers.
96. Domestic help.
98. Dressmakers.
111. Drivers (not chauffeurs).
56 Druggists.
52. Editors.
6. Electricians.
114. Elevator operators.
57. Engineers (civil, mechanical, electrical, mining)
36. Engineers (stationary).
93 Factory workers, unclassified (light).
36. Firemen.
45. Firemen (city department).
2. Fishermen.
17. Food canners and preservers.
19. Foundry workers.
25. Furniture and cabinet makers.
15. Furriers.
14. Garment operatives.
46. Government officials.
97. Granite workers.
1. Horticulturists
65. Hotel keepers.
69. Housewives.
83. Inspectors.
12. Iron workers (structural).
20. Iron workers.
113. Janitors.
27. Jewelers, and silversmiths.
52. Journalist.
92. Laborers.
115. Laundry employees.
58. Lawyers.
23. Leather products makers.
94. Librarian.
30. Lithographers.
21. Machinists (office, store).
70. Managers (plant).
81. Manufacturers.
39. Marine officers.
7. Masons.
4. Mechanics (master).
42. Merchants and jobbers.
88. Metal workers.
99. Milliners.
3. Miners (all).
90. Missionaries.
91. Musicians.
59. Nurses (trained).
73. Officers of corporations
60. Optometrists.
13. Paint and pigment makers.
8. Painters.
9. Paperhangers.
29. Paper products makers.
116. Peddlers.
31. Photoengravers.
74. Photographers.
61. Physicians and surgeons.
10. Plasterers.
11. Plumbers, pipe and steam fitters.
47. Police officers.
48. Post Office employees.
62. Principals.
32. Printers.
62. Professors.
33. Publishers.
37. Railroad employees.
65. Restaurant keepers.
112. Reporters.
80. Retired.
35. Rubber mill employees.
43. Salesmen.
24. Shoe factory operatives
40. Solicitors.
20. Steel mill workers.
117. Stewards.
38. Street railway employees.
75. Students.
70. Superintendents (plant, office, store).
62. Superintendents (school).
85. Tailors.
62. Teachers.
76. Telegraph operators.
76. Telephone operators.
72. Tellers.
34. Textile mill operators.
28. Tinsmiths.
77. Undertakers and embalmers.
89. Upholsterers.
13. Varnish and dry color makers.
63. Veterinarians.
66. Waiters and hotel servants.
95. Watchmen
26. Woodworkers.
52. Waiters (professional).
99. All others.

Fig. 78.—*Continued.*

AVERAGE SYSTOLIC PRESSURE

Age.	Systolic Women, mm.	Men, mm.
20	116	120
30	119	122
40	124	125
50	130	129
60	134	134
All ages	121	124

RACE AND SEX

1. White male.
2. White female.
3. Colored male.
4. Colored female.
5.
6.
7.
9.
9.
10.
11. Born in U. S.
12. Foreign born.

FAMILY HISTORY

0—None given.
1—Tuberculosis.
2—Cancer.
3—Epilepsy.
4—Nephritis or Bright's disease.
5—Apoplexy or arterial disease, stroke, cerebral hemorrhage.
6—Nervous diseases.
7—Insanity
8—Other pulmonary diseases than tuberculosis.
9—Syphilis.
11—Diabetes.
12—General lack of longevity

WEIGHT%

0. None given.
1. Over 40% underweight
2. 40—30% "
3. 30—20% "
4. 20—10% "
5. 10— 5% "
6. Normal(less than 5% under-or over-weight)
7. 5—10% overweight
8. 10—20% "
9. 20—30% "
11. 30—40% "
12. Over 40% "

A. PERSONAL HISTORY

0—Normal (none given).
1—Tuberculosis.
2—Typhoid fever.
3—Influenza (recent).
4—Gall-stones, or gall-bladder disease.
5—Renal calculi (kidney stones).
6—Nephritis (Bright's disease).
7—Epilepsy.
8—Nervous breakdown.
9—Miscarriage (spontaneous) or stillborn.
11—Neuritis.
12—Ulcers of stomach or intestines or other severe gastric disturbances.

HEIGHT

0. No height given.
1. Under 4′ 8″
2. 4′ 8″ + to 4′ 10″
3. 4′ 10″ + to 5′
4. 5′+ to 5′ 2″
5. 5′ 2″+ to 5′ 4″
6. 5′ 4″ + to 5′ 6″
7. 5′ 6″+to 5′ 8″
8. 5′8″ + to 5′ 10″
9. 5′ 10″ + to 6′
11. 6′ + to 6 2″
12. Over 6 2″

RATING

0. None given.
1. AA
2. A
3. A-B
4. B
5. B-C
6. C
7. C-D
8. D
9. D-E
11. E
12.

B. PERSONAL HISTORY

0—None.
1—Operation for hernia.
2—Operation for appendicitis.
3—History of cancer.
4—Operation for condition in pelvic region.
5—Rheumatism or gout (muscular or arthritis.)
6—Tonsilitis.
7—Pleurisy. Pneumonia or other pulmonary infection (not T. B.)
8—History of removal of tumor, breast, uterus.
9—Gonorrhea (old infection).
11—Syphilis (positive).
12— " (uncertain or history of negative Wassermann.)

Fig. 78.—*Continued.*

LIFE EXTENSION INSTITUTE—Statistics Section

C. ERRORS IN DIET AND HYGIENE

0—None found.
1—Too high protein diet.
2—Too little water consumed.
3—Too much tea and coffee.
4—Other errors in diet.
5—Alcohol temperate.
6— " excessive.
7—Tobacco temperate.
8— " excessive.
9—Rapid eating.
11—Diet deficiency (specific vitamine bulk insufficient).
12—Diet excess (general).

D. EFFECTS OF OCCUPATION

0—None.
1—Complaint of fatigue (lack of energy).
2—Hours of work too long.
3—Lack of exercise.
4—Occupational poisoning.
5— " strain.
6—Exposure to great heat.
7— " " poisonous fumes.
8— " " dust.
9— " " excessive moisture.
11— " " noise.
12—Eye strain.

E. BUILD, POSTURE, WEIGHT

0—Normal.
1—Light frame.
2—Heavy "
3—Recent loss in weight.
4—
5—
6—
7—
8—Faulty posture.
9—Spinal curvature.
11—Flat foot.
12—Bony deformities, ankylosis, and subtraction.

F. EYES AND EARS

0—Normal.
1—Defective vision—corrected.
2— " " —uncorrected.
3—Disease of external eye or eyelids.
4—Eye ground changes.
5—Blindness in both eyes.
6—Cataract.
7—Defective hearing.
8—Practically total deafness.
9—Otitis media or discharging ears.
11—Perforation of drum with or without operation.
12—Wax in ears.

P2

G. NOSE AND THROAT

0—Normal.
1—Deflected septum—slight.
2— " " —marked.
3—Enlarged, septic, buried, or cryptic tonsils. (+ + +)
4—Naso-pharyngitis (chronic).
5—Naso-pharyngitis (acute).
6—Adenoids.
7—Infection of nasal accessory sinus.
8—Hypertrophic rhinitis (enlarged turbinates).
9—Atrophic rhinitis.
11—Perforation of septum (no history of operation).
12—Polypi, growths, ulcers.

H. TEETH AND ROOT INFECTION

0—Normal.
1—Carious teeth, septic roots, need dental attention.
2—Slightly infected gums (including recession).
3—Pyorrhea (definite).
4—Heavy dentistry (X-ray advised, suspected infection).
5—X-ray shows infection of one tooth.
6— " " " of two or more teeth.
7— " " resorption of alveolar process.
8—Insufficient dentistry (missing teeth).
9—Irregular and malocclouded teeth.
11—Root infection with systemic symptoms (Anemia, Rheumatism, L. B. P.)
12—Root infection with organic symptoms (Heart, arteries, lungs, H. B. P.)

I HEART AND PULSE

0—Normal.
1—Functional murmur or irregularity.
2—Mitral murmur—stenosis.
3— " " —regurgitation (leaking valve).
4—Aortic " —stenosis.
5— " " —regurgitation (leaking valve).
6—Enlargement.
7—Myocardial changes.
8—Slow pulse below 58.
9—Rapid pulse above 90.
11—Intermittent pulse, extra systoles.
12—Auricular fibrillation, heart block, paroxysmal tachycardia or other serious impairments including murmurs of tricuspid valve.

J BLOOD VESSELS AND BLOOD PRESSURE

0—Normal condition of blood vessels.
1—Arterial thickening, slight.
2— " " moderate.
3— " " marked.
4—Other blood vessel changes.
5—Varicose veins.
6—Normal blood pressure.
7—B. P. 15-25 below average for age.
8—B. P. 25 or more below average for age.
9—B. P. 20-40 above average for age.
11—B. P. 40-60 " " " "
12—B. P. 60 or more above average for age.

Fig. 78.—*Continued.*

LIFE EXTENSION INSTITUTE—Statistics Section

K. LUNGS AND OTHER RESPIRATORY

0—Normal.
1—Bronchitis (acute).
2— " (chronic).
3—Asthma.
4—Emphysema.
5—Abnormal signs in lungs, not suggestive of T. B.
6—Suspected tuberculosis.
7—Incipient "
8—Moderately advanced tuberculosis.
9—Advanced tuberculosis.
11—
12—Sputum analysis made.

L. STOMACH AND ABDOMINAL ORGANS

0—Normal.
1—Acid stomach.
2—Gastric disturbances.
3—Constipation.
4—Diarrhea.
5—Tenderness over liver or gall bladder.
6—Enlargement or hardening of liver.
7—Tenderness in region of appendix.
8—Ulcer of stomach or intestines, found or suspected.
9—Hemorrhoids, or bleeding from rectum.
11—Fistula in ano.
12—Fissure in ano, ulcers.

M ABDOMINAL AND INGUINAL REGIONS

0—Normal.
1—Weak inguinal rings.
2—Inguinal hernia no truss.
3— " " truss worn.
4—Other hernias.
5—Gastro enteroptosis, visceroptosis
6—Varicocele.
7—Hydrocele.
8—
9—
11—
12—

N. GENITO-URINARY

0—Normal.
1—Prostate enlarged, hard, tender, or boggy.
2—Stricture of urethra.
3—Testicles hard or tender.
4—Frequent or painful urination (nocturia).
5—Cystitis (inflammation of bladder).
6—Tenderness over ovary.
7—Rectocele, cystocele, or severe displacement of uterus.
8—Diseases of uterus (laceration or erosion of cervix).
9—Dysmenorrhea, leucorrhea, profuse or irregular menstruation.
11—Syphilitic lesion or sores—or doctor's positive statement of syphilis (lues).
12—

O. BRAIN AND NERVOUS SYSTEM

0—Normal.
1—Nervousness.
2—Exaggerated reflexes and tremors not due to nervousness.
3—Reflexes sluggish, absent, unequal or irregular
4—Ataxic speech or gait.
5—Romberg—positive.
6—Cerebro-spinal syphilis.
7—Neurasthenia, psychasthenia, excitability (hysteria), depression (melancholia).
8—
9—
11—Nervousness with increased reflexes.
12—Neurological or neuropsychiatric examination made.

P. ENDOCRINE DISTURBANCES

0—Normal.
1—Hypothyroidism.
2—Enlarged thyroid—simple goitre.
3—Evidence of dysfunction of thyroid, (toxic) thyroid or exophthalmic goitre.
4—Evidence of dysfunction of pituitary gland.
5—
6—Adrenal deficiency.
7—Pluriglandular dysfunction.
8—Gonadal dysfunction (ovaries or testicles).
9—
11—
12—Basal Metabolism test made.

Q. MISCELLANEOUS IMPAIRMENTS

0—Normal.
1—Adenitis (glands, lymphatics).
2—Anaemia—hemoglobin below 75.
3—Tuberculosis of glands or other than pulmonary.
4—Chronic skin affection (acne, Dermitiitis, eczema, pruritis ani.)
5—Marked pigmentation.
6—Dizziness (vertigo).
7—Insomnia.
8—Backache.
9—Headache.
11—Use of patent medicine.
12—Habitual use of laxatives

R. MISCELLANEOUS IMPAIRMENTS

0—Normal.
1—Laryngitis chronic.
2—
3—Frequent colds.
4—Mastoids—History of or found at present time.
5—Oedema.
6—Neuralgia or neuritis.
7—Paralysis of any degree or place.
8—Not aware of impairments found.
9—Aware of impairments found.
11—Now under doctor's care.
12—Unclassified impairment.

Fig. 78.—*Continued.*

LIFE EXTENSION INSTITUTE—Statistics Section

S URINALYSIS FINDINGS

0—Normal.
1—Albumin, slight trace.
2— " definite trace.
3— " marked amount.
4—Sugar, trace.
5— " marked amount (quantitative 1% or more.)
6—Acetone.
7—Pus (large amount or persistent, numerous leucocytes).
8—Blood.
9—Casts (granular or epithelial).
11— " (hyaline).
12—Indican.

T. URINALYSIS FINDINGS AND KIDNEY FUNCTION TESTS

0—Normal.
1—Low specific gravity.
2—High " "
3—Dye test
4—Concentration test.
5—Sodium chloride test.
6—Complete blood chemistry.
7—
8—
9—
11—Urea nitrogen, blood test.
12—Uric acid, blood test.

U SPECIAL TESTS

0—None made.
1—Feces analysis.
2—Liver function test
3—Special rectal examination.
4—Complete blood count
5—Differential white blood count.
6—Special heart examination.
7—Sugar tolerance test normal.
8— " " " abnormal.
9—Blood sugar test normal.
11— " " " abnormal.
12—Tonsil culture.

V. SPECIAL TESTS

0—None made.
1—Prostatic smear not showing gonorrheal infection
2—Prostatic smear showing gonorrheal infection.
3—Vaginal smear not showing gonorrheal infection.
4—Vaginal smear showing gonorrheal infection.
5—Wassermann negative.
6—Second Wassermann negative.
7—Wassermann slightly positive 1 or 2 plus (+).
8—Wassermann strongly positive, 3 or more plus (+)
9—Second Wassermann positive.
11—Gastric analysis—normal.
12— " " H. C. L. reduced or increased—shows blood or other pathology.

P4

W. CYSTS, TUMORS, CANCERS
SPLIT COLUMN

0—None found.
1—Head.
2—Breast.
3—Stomach.
4—Intestines.
5—Uterus.
6—Ovaries.
7—Skin, (epitheleoma, moles).
8—Fatty.
9—Other part of body.
11—Probably benign.
12— " malignant.

X X-RAYS MADE, PROTEIN SENSITIZATION TEST

0—None made.
1—Teeth.
2—Chest, lungs, heart.
3—Head.
4—Spine.
5—Legs, arms and joints.
6—Gastro-intestinal.
7—Kidneys.
8—Gall-bladder region.
9—Protein sensitization test negative.
11— " " " positive epidermal or for pollen.
12—Protein sensitization test positive for food or bacteria.

Y X-RAY OF HEART AND CHEST

0—Chest, heart and lungs negative or normal.
1—Heart enlarged—slightly.
2— " " —definitely.
3— " displaced.
4— " sinuses infected.
5— " shows dilated aorta, aortic changes.
6—Circulation—aneurysm.
7—
8—Lungs show marked bronchial thickening.
9—Lungs show old foci of tuberculosis.
11—Lungs show active foci of tuberculosis.
12—

Z. FOLLOW-UP RECORD

0—No improvement.
1—Improvement in diet or hygiene.
2— " " physical condition.
3—Tonsils removed, improvement noted.
4— " " no improvement noted.
5—Infected teeth removed, improvement noted.
6— " " " no improvement noted.
7—
8—
9—
11—Check-up (mid-year P. H.)
12—Check-up—Examination.

Fig. 78.—*Concluded.*

STATISTICAL ANALYSIS OF IMPAIRMENTS FOUND IN EXAMINATIONS MADE FOR

_____

Date_____

NUMBER OF COMPLETE EXAMINATIONS_____

NUMBER OF EXAMINATIONS WITHOUT URINALYSIS_____

NUMBER OF MEN_____ NUMBER OF WOMEN_____ AVERAGE AGE_____

CLASSIFICATION

CLASS		RATING	NUMBER	PERCENT
No. 1	No physical defects or errors in hygiene	AA		
No. 2	Very minor defects requiring attention or observation.	A & A-B		
No. 3	Minor defects requiring hygienic correction, or minor medical, surgical or dental attention	B & B-C		
No. 4	Moderate defects requiring medical supervision as well as hygienic correction. Impairment influencing longevity.	C		
No. 5	Advanced physical impairments requiring systematic medical or surgical attention.	C-D & D		
No. 6	Serious physical condition requiring immediate medical or surgical attention.	E		
		Total		100%

Fig. 79.—Statistical analysis of impairments.

IMPAIRMENTS BY SYSTEMS:

CIRCULATORY SYSTEM

Blood vessels:
- Arterial thickening—(slight)
- " " —(moderate)
- " " —(marked)
- Varicose veins
- Varicocele

Blood pressure:
- High—20 to 40 mm. above average for age
- High—more than 40 mm. above average for age
- Low—15 to 25 mm. below average for age
- Low—more than 25 mm. below average for age

Heart:
- Functional signs
- Enlargement
- Murmur or organic change

RESPIRATORY SYSTEM

Upper tract:
- Nasal and pharyngeal
- Tonsils
- Other respiratory

Lungs:
- Bronchitis (chronic or recurrent)
- Abnormal signs
- Tuberculosis suspected
- " positive

DIGESTIVE SYSTEM

- Teeth—carious or in need of dental attention
- Gums—infected
- History of indigestion or pain (distress)
- Visceroptosis
- Ulcer of stomach or intestines
- Appendicitis suspected
- Liver and gall-bladder
- Constipation
- Hemorrhoids
- Fistula

Fig. 79.—*Continued.*

GENITO-URINARY SYSTEM
- Urine:
  - Albumin—slight trace
  - " —definite amount
  - " —marked
  - Casts, blood or pus
  - Other urinary
  - Sugar—slight trace
  - " —marked amount (1.% or more)
- Prostatic change (No. of Males used for %)
- Uterine and pelvic defects (No. of Females used for %)
- Other genito-urinary impairment
- Gonorrhea (active or history)

BRAIN AND NERVOUS SYSTEMS
- Functional Disturbance
- Changes in central nervous system
- Organs of special sense:
  - Eyes—defect corrected
  - " — " uncorrected
  - Ears—defective hearing
  - " —evidence of middle ear infection

ENDOCRINE SYSTEM
- Hypothyroidism
- Goitre—simple (cystic)
- " —with symptoms (toxic)
- Other endocrine disturbances

STRUCTURAL (SKELETAL AND MUSCULAR)
- Spinal curvature
- Faulty posture
- Inguinal region
  - Weak rings
  - Hernia—truss worn
  - " —no truss worn
- Other hernias
- Flat foot

TUMORS
- Benign
- Malignant growth suspected

SKIN
- Eruptions, Lesions

Fig. 79.—*Continued.*

SYSTEMIC SYMPTOMS OR CONDITIONS

Rheumatism (arthritis)
Neuritis or muscular rheumatism
Headaches
Anemia
Underweight Moderate—10% to 20%
" Extreme—20% to 40%
" with High blood pressure
" with Low " "
Overweight Moderate—10% to 20%
" Extreme—20% to 40%
" with High blood pressure
" with Low " "
Syphilis—positive history
" —doubtful finding
" —positive finding
Wassermann's made
" —positive
Syphilis and organic impairments
Heart or blood vessels or kidneys
Heart and " " and "
Focal infection and heart or blood vessels, or kidneys, or high or low blood pressure

UNCLASSIFIED

Unusual defects or history

HYGIENIC AND DIETETIC HABITS

Excess tea or coffee (more than 2 cups)
Tobacco—temperate use
" —excessive " (more than 3 cigars, 8 cigarettes or pipefuls)
Alcohol—temperate use
" —excessive " (daily whisky, cocktails, qt. beer, pt. wine)
Use of nostrums
Errors in diet
" " exercise
Other errors in personal hygiene

Fig. 79.—*Concluded.*

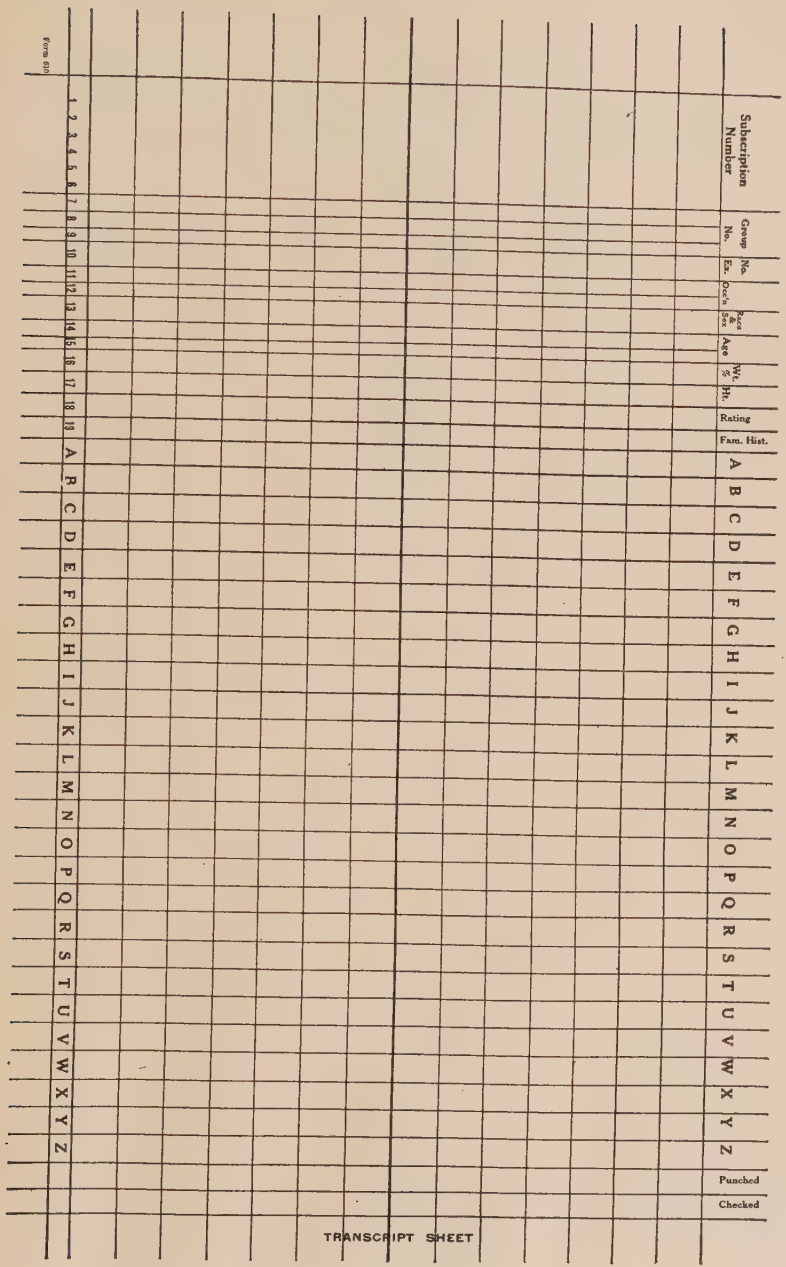

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Fig. 80.—Transcript sheet.

Fig. 81.—Statistical punch card.

Special Tests and Supplementary Diagnostic Measures

In view of the differences of opinion that exist with regard to the value of laboratory, *x*-ray, and other specialized supplementary investigations apart from the fundamental physical examination, a study of 100 cases examined by ultimate methods is submitted.[1]

These individuals were policyholders who were entitled to the fundamental physical examination as a privilege extended by the life insurance company. A special routine was devised for this group including those tests which would enable one to form a fairly positive opinion as to the existence of any organic impairment or condition that was definitely menacing to the vital organs. No charge was made for these special tests, so that all question of selection might be eliminated and the study be well balanced and truly representative of the average condition of such people.

The following table shows the results of this study:

(Average Age 43)

Disease or Organic Change.	Heart.		Kidneys.		Lungs.		Venereal history, Clinical signs, Wassermann.		Tonsils.		Teeth.		Sugar metabolism.	
Relative Importance of Defects Revealed.	Slight.	Definite.	Slight.	Definite.	Slight.	Definite.	Slight.	Definite.	Slight.	Definite.	Slight.	Definite.	Slight.	Definite.
A. Impairments found by physical examination and urinalysis	7	1	10	0	0	0	0	0	49	12		Crowns 36	4	1
B. Impairments found by additional laboratory tests and *x*-ray examinations.	33	10	35	15	2	0	0	0	0	Hemo. Staph. & Strep. 35	32	25	5	1
C. Number (of B) found by tests indicated by findings of physical examination or urinalysis	3	2	5	3	0	0	0	0	0	30	9	20	2	1
D. Number (of B) found by tests given by protective routine (no indication of need)	30	8	30	12	2	0	0	0	0	5	23	5	3	0

[1] The Value of Complete Routine Examinations in Supposedly Healthy People, by Eugene Lyman Fisk, Boston Med. and Surg. Jour., October 14, 1926.

A striking feature of this study is the important ratio of organic impairment revealed by the routine inclusion of these tests regardless of the apparent condition of the individual. These findings should be a lesson to those who are accustomed to belittle the value of laboratory and specialized supplementary investigations. No matter how painstaking and critical the fundamental physical examination may be, in any considerable number of cases the routine application of these special tests will reveal an important number of impairments that would otherwise be overlooked.

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